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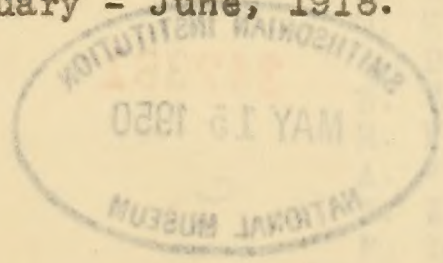
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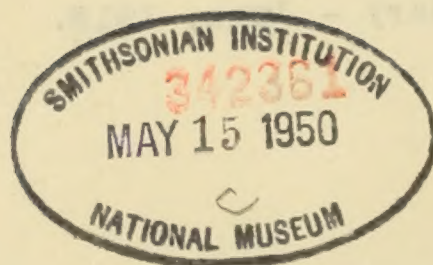
U.S. Patent #

GRAPHOPHONE PATENT VOLUME 20.

January - June, 1918.



MINERAL LITE
OF
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 1,257,939

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MS.D. Private 19148) Nat. Law. Books Co. 12 May 50 L.H.

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C. F. W. Forsberg,

ALPHABETICAL LIST
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GRAPHOPHONE PATENT VOLUME 20.

January - June, 1918.

VOL. 20

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January - June, 1918.

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TALKING MACHINE.

1,251,565 ----- E. Pathe.
Patented Jan. 1, 1918.
Filed Sept. 28, 1916.

E. PATHÉ.
TALKING MACHINE.
APPLICATION FILED SEPT. 28, 1916.

1,251,565.

Patented Jan. 1, 1918.

3 SHEETS—SHEET 1.

Fig. 1

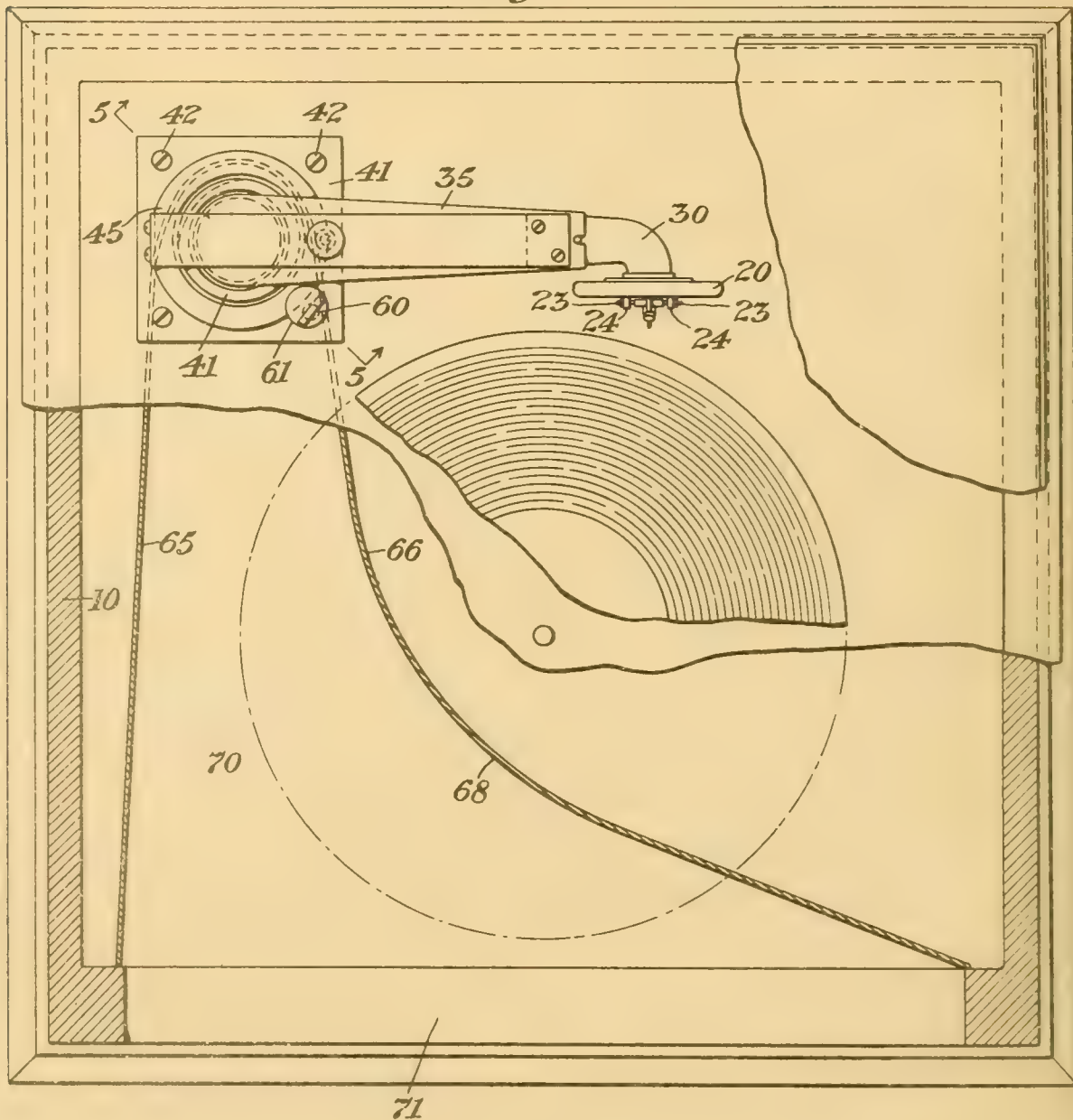
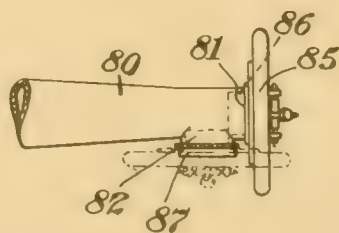


Fig. 6



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TALKING MACHINE.
APPLICATION FILED SEPT. 28, 1916.

1,251,565.

Patented Jan. 1, 1918.
3 SHEETS—SHEET 2.

Fig. 2

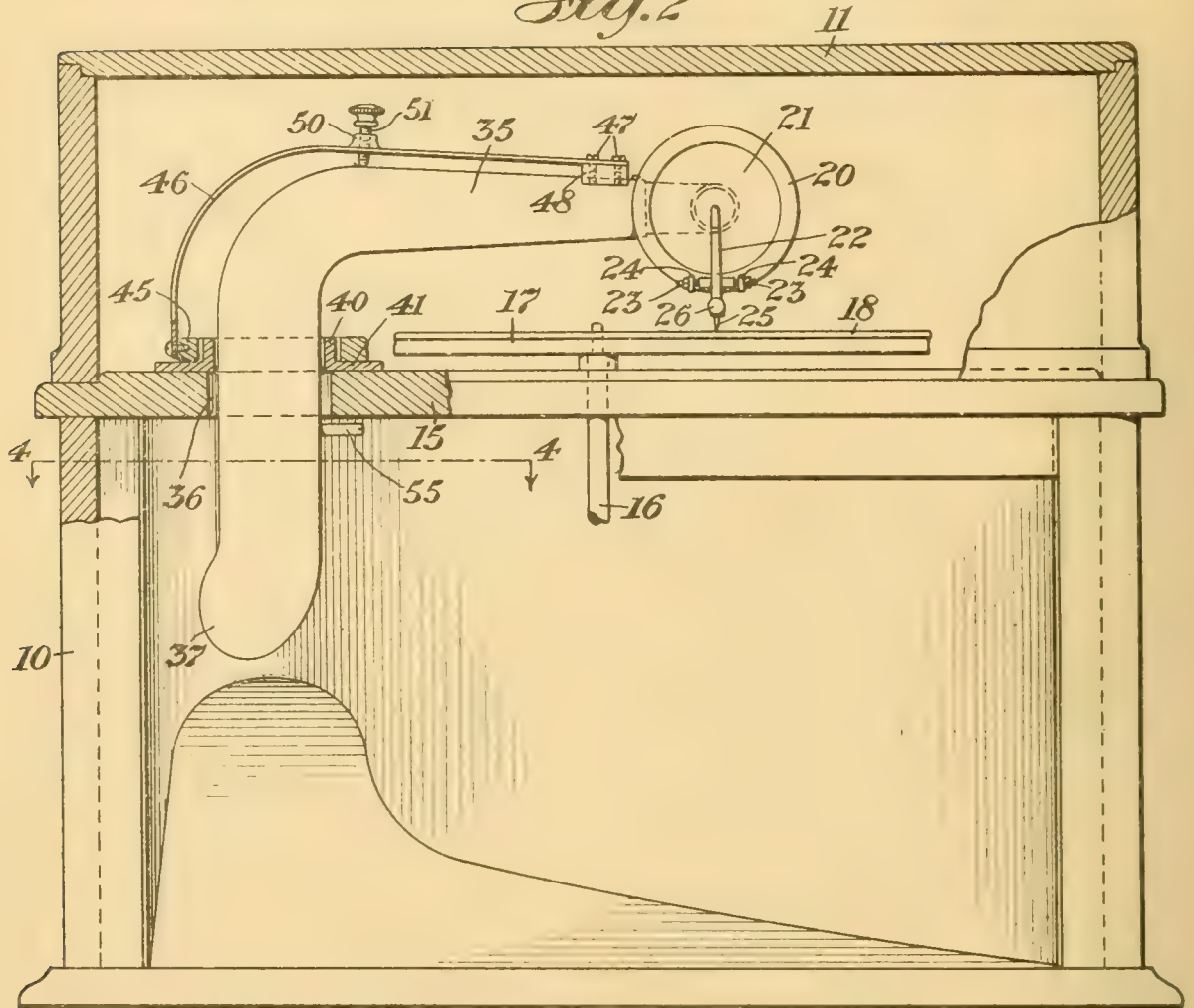
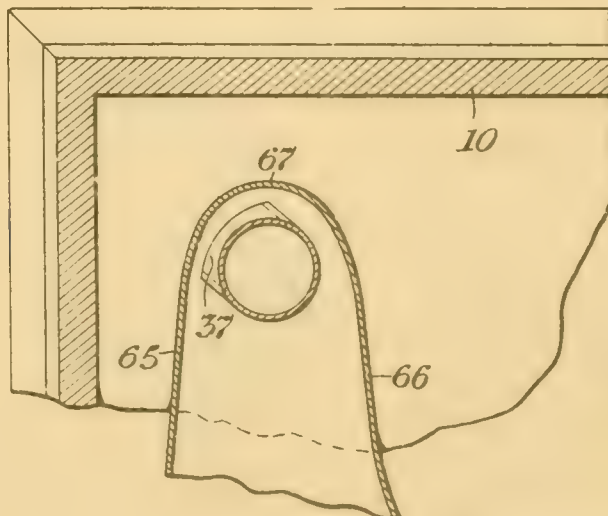


Fig. 4



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Patented Jan. 1, 1918.
3 SHEETS—SHEET 3.

Fig. 3

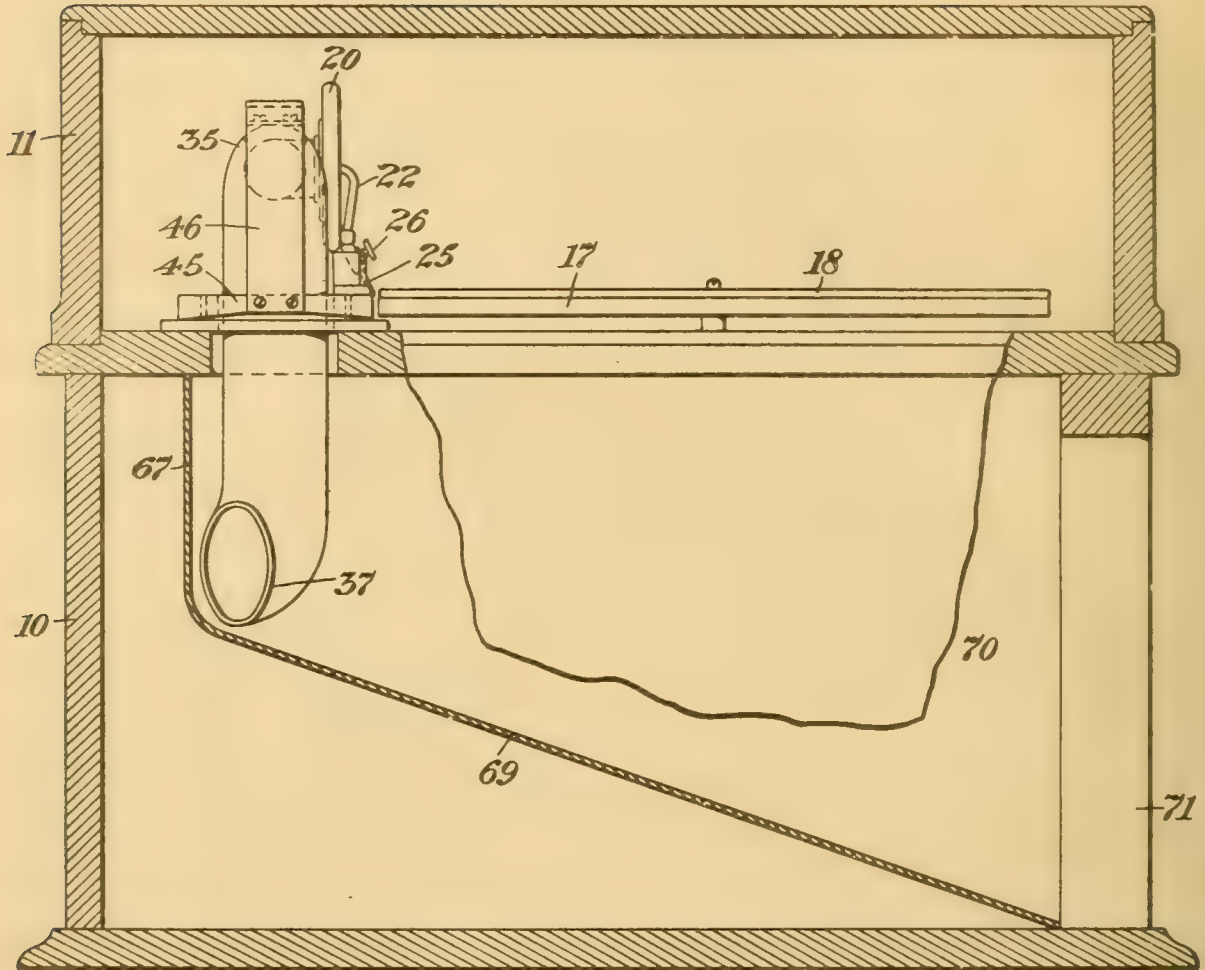


Fig. 5

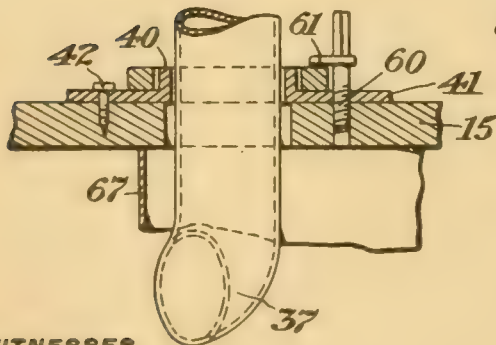


Fig. 7

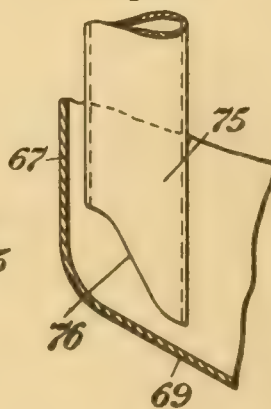
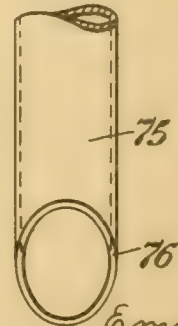


Fig. 8



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UNITED STATES PATENT OFFICE.

EMILE PATHÉ, OF PARIS, FRANCE, ASSIGNOR TO PATHE FRERES PHONOGRAPH COMPANY, OF NEW YORK, N. Y.

TALKING-MACHINE.

1,251,565.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed September 28, 1916. Serial No. 122,605.

To all whom it may concern:

Be it known that I, EMILE PATHÉ, a citizen of the Republic of France, and a resident of Paris, France, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

Some of the objects of this invention are to provide in a talking machine improved means for supporting a sound box arm; to provide in a talking machine an improved sound box arm; and to provide other improvements as will appear hereinafter.

In the accompanying drawings Figure 1 is a fragmentary top plan view of a talking machine constructed in accordance with this invention; Fig. 2 a fragmentary front elevation of the same; Fig. 3 a fragmentary side elevation of the same; Fig. 4 a fragmentary horizontal section on line 4—4 of Fig. 2; Fig. 5 a fragmentary section on line 5—5 of Fig. 1; Fig. 6 a fragmentary top plan view of a modified form of sound box arm constructed in accordance with this invention; and Figs. 7 and 8 are a fragmentary side elevation and a fragmentary rear elevation respectively of a modified form of sound box arm constructed in accordance with this invention.

Referring to the drawings, one embodiment of this invention comprises a talking machine including a cabinet having a substantially rectangular body portion 10 and a corresponding rectangular hollow cover 11 superposed thereon and horizontally connected thereto or otherwise movable with respect thereto. The body portion 10 includes a substantially horizontal rigid top wall 15, through which projects a vertical turntable spindle 16 which is arranged to rotate about a fixed vertical axis coincident with its longitudinal axis and which carries upon its upper end a rotary turntable or disk record support 17 adapted to carry a disk sound record 18. The spindle 16 is arranged to be rotated by any suitable motor (not shown) which is arranged within the body portion 10 of the cabinet and outside of the forwardly flaring sound amplifier which is also arranged within the body portion 10, as will appear hereinafter.

For cooperating with the sound record 18, any suitable sound box or sound reproducing means may be arranged above the record.

In the form of this invention shown a sound

box is provided which comprises a substantially cylindrical casing 20 containing a vertical circular diaphragm 21, which is arranged to be vibrated by a stylus bar 22 which is mounted to oscillate in a substantially vertical plane about a substantially horizontal fixed axis on aligned spaced pivots 23 carried by spaced lugs 24, which are fixed upon the sound box casing 20. The lower portion of the stylus bar 22 is preferably arranged to extend downwardly and obliquely away from its axis of oscillation and is provided at its lower end with an axial socket in which the usual or any suitable stylus 25 is clamped by means of a set screw 26 extending through the lower portion of the stylus bar.

The sound box casing 20 is provided with a rearwardly projecting tubular extension or neck 30, secured thereto and communicating therewith, and which is curved longitudinally through an arc of about 90 degrees and fits snugly into the smaller end of a longitudinally tapering sound box arm or tone arm 35 which extends in a substantially horizontal direction away from the neck 30 to a point above the left hand rear corner portion of the horizontal top wall 15 of the body portion 10 and then curves downwardly through an arc of 90 degrees and extends vertically downwardly and freely through a circular aperture 36 provided therefor in the top wall 15, and terminates within the body portion 10 in a longitudinally curved and rearwardly facing open end 37.

For supporting the sound box arm 35 in such a manner as to permit the sound box 20 to swing laterally across the record 18 or vertically toward and away from the record, an annular vertical cylindrical sleeve 40, provided at its lower end with a flat rectangular flange 41, loosely surrounds the vertical portion of the sound box arm 35 and is rigidly secured to the upper surface of the top wall 15 by means of screws 42 or in any other suitable manner. Loosely and rotatably surrounding the sleeve 40 and resting slidably upon the flange 41 is an annular carrier 45 to which is rigidly secured one end of a tempered steel spring 46 which is curved longitudinally upwardly from the carrier 45 through an arc of about 90 degrees and is then extended above and longitudinally of the substantially horizontal portion of the sound box arm 35, and the forward end of

this spring 46 is rigidly secured to the smaller end of the sound box arm by means of the screws 47 which extend through the spring and are threaded into a lug 48 which is rigidly secured to the upper surface of the sound box arm.

For adjusting the position of the sound box arm 35 with respect to the spring 46, so that when the sound box 20 is in operation the vertical portion of the sound box arm 35 will extend freely and centrally through the sleeve 40 and the aperture 36 without contacting at any time with the sleeve 40 or the wall of the aperture 36, a boss 50 is rigidly secured to the upper surface of the spring 46 at a point approximately midway between the ends of the spring, and an adjusting screw 51 is threaded downwardly through the boss 50 and through the spring 46 and engages at its lower end against the upper surface of the sound box arm 35. By turning the screw 51 so as to move the screw downwardly through the spring 46, the vertical portion of the sound box arm 35 will be forced toward the right as viewed in Fig. 2, and by rotating the screw 51 so as to move the screw upwardly with respect to the spring 46 the vertical portion of the sound box arm 35 will be permitted to be moved toward the left as viewed in Fig. 2 under the action of the spring 46. Thus, by a proper regulation of the screw 51 the vertical portion of the sound box arm 35 may be so arranged with respect to the sleeve 40 that when the sound box 20 is in operation the vertical portion of the sound box arm 35 will be centralized with respect to the sleeve 40.

After the screw 51 has been thus adjusted to centralize the vertical portion of the sound box arm 35 when the sound box arm is in operation, any number of sound records may be played without changing the adjustment of the screw 51. When the screw 51 has been thus adjusted the spring 46 serves as the sole support of the sound box arm 35 and the sound box 20 carried thereby, excepting such support as may be furnished by the sound record 18 through the stylus 25 when the stylus is in an operative position upon the record. When the stylus 25 is removed from the record, as shown in Figs. 1 and 3, then the spring 46 permits the sound box 20 to fall slightly so that the lower end of the stylus 25 is slightly below the horizontal plane of the upper surface of the sound record 18.

For preventing the withdrawal of the sound box arm 35 upwardly from the sleeve 40, a substantially horizontal pin or stop 55 is threaded into the sound box arm 35 at a point normally spaced slightly below the top wall 15.

For holding the sound box arm 35 securely in a fixed position for convenience in trans-

porting the talking machine, a vertical screw 60, provided with an eccentric head 61, is threaded into the flange 41 and is arranged so that the head 61 may be rotated into position upon the upper surface of the carrier 45 to clamp the carrier in a fixed position upon the flange 41 and to hold the sound box arm in a given position during transportation. When it is desired to operate the sound box, the screw 60 is rotated into such a position that its head 61 will be out of engagement with the carrier and will permit the carrier to rotate freely about the sleeve 40.

For amplifying the sound waves delivered downwardly through the sound box arm 35, two vertical forwardly flaring sounding boards 65 and 66 are arranged within the body portion 10 of the cabinet and are connected at their inner ends by a vertically substantially semi-cylindrical partition 67. One of these sounding boards 65 is substantially flat, while the other sounding board 66 is curved longitudinally and has a substantially convex surface 68 which faces toward the front of the cabinet. A substantially flat sounding board 69, which is horizontal in transverse section, is spaced slightly below the lower end 37 of the sound box and slopes downwardly and forwardly from the rear semi-cylindrical wall 67 to the front lower edge of the inner surface of the front wall of the body portion 10 of the cabinet and connects the lower edges of the two vertical sounding boards 65 and 66 and forms, in combination with the vertical sounding boards 65 and 66 and the top wall 15, a forwardly flaring sound amplifying passage through which the sound waves are delivered outwardly through a rectangular opening 71 provided therefor in the front wall of the body portion 10 of the cabinet. This opening 71 may be provided with doors or with a suitable grill in a well known manner.

Instead of having the lower ends of the sound box arm 35 curved longitudinally as shown in Figs. 1, 2 and 3, the lower end of the sound box arm 35 might be made substantially straight and vertical as shown at 75 in Figs. 7 and 8, and in this case the lower end of the tone arm may terminate in an obliquely arranged open end having a longitudinally curved edge wall 76, which in side elevation presents the appearance of a compound curve as shown in Fig. 7 and which in rear elevation presents approximately the appearance of an ellipse slightly flattened at its smaller ends.

Instead of having the smaller end of the sound box arm 35 constructed as shown in Figs. 1, 2 and 3, the smaller end of the sound box arm may be constructed as shown in Fig. 6, in which the smaller portion 80 of the arm is provided with a cylindrical

open end 81 coaxial therewith and also with a lateral, short, cylindrical extension 82 projecting horizontally therefrom and having an open outer end of the same size as the other open end 81 so that a sound box 85 constructed as hereinbefore described but provided with a short cylindrical neck 86 may be telescopically secured either in the cylindrical open end 81 as shown in full lines, or in the tubular extension 82 as shown in dotted lines. A cap 87 is provided which is proportioned to fit snugly either over the outer end of the open end 81 of the sound box arm or over the open end of the extension 82 so as to close either one of these openings that would otherwise be left open when the sound box is in either of its positions of adjustment.

When the sound box 85 is adjusted as shown in full lines in Fig. 6, then the diaphragm of the sound box is in a plane perpendicular to the longitudinal axis of the sound box arm 80, and when the sound box is adjusted in the position shown in dotted lines, the diaphragm of the sound box is in a plane parallel to the longitudinal axis of the sound box arm 80.

The operation of this invention will be fully understood from the foregoing description, from which it is evident that this invention provides, among other things, a yielding or spring mounting for a sound box arm which permits the arm to travel freely across the record or to be moved freely vertically toward or away from the plane of record, and also which supports the sound box arm free of any other parts of the talking machine and therefore permits of a smooth action on the part of the sound reproducing means and also avoids the objectionable buzzing or rattling noises which are sometimes incident to talking machines in which the sound box arm is supported in contact with a surrounding metal mounting.

Although only a few of the forms in which this invention may be embodied have been shown herein, it is to be understood that the invention is not limited to any specific construction, but might be applied in various forms without departing from the spirit of the invention or the scope of the appended claims.

Having thus fully described this invention, I claim:

1. In a talking machine, sound reproducing means arranged to cooperate with a sound record, and spring means forming the sole support of said sound reproducing means excepting such support as is provided by the sound record when said sound reproducing means is in operation.

2. In a talking machine, a hollow sound conveying arm, sound reproducing means carried by said arm and adapted to cooperate with a sound record, and spring means

connected to said arm and forming the sole support of said arm and said sound reproducing means excepting such support as is provided by the sound record when said sound reproducing means is in operation.

3. In a talking machine, the combination with an annular stationary member, of a tubular sound conveying arm extending freely through said annular member, sound reproducing means carried by said arm, yielding means supporting said arm, and means for adjusting said arm with respect to said yielding means to centralize said arm with respect to said annular member.

4. In a talking machine, the combination with means providing an opening, of a tubular sound conveying arm extending through said opening, sound reproducing means carried by said arm, means for supporting said arm, and means for adjusting said arm in a direction transverse to the longitudinal axis of said opening to centralize said arm with respect to said opening when said arm is in operation.

5. In a talking machine, the combination with means providing an opening, of a tubular sound conveying arm extending through said opening, sound reproducing means carried by said arm, yielding means for supporting said arm, and means for adjusting said arm in a direction transverse to the longitudinal axis of said opening to centralize said arm with respect to said opening when said arm is in operation.

6. In a talking machine, the combination with stationary means provided with an opening, of a hollow sound box arm having a portion extending upwardly through said opening, a sound box carried by said arm, a spring supporting said arm, and means carried by said spring and engaging said arm to centralize said arm with respect to said opening.

7. In a talking machine, the combination with a stationary substantially vertical cylindrical sleeve, of a hollow sound box arm having a portion extending freely through said sleeve, a sound box carried by said arm, an annular carrier rotatably surrounding said sleeve, and a spring connecting said carrier and said arm for holding said arm in an operative position.

8. In a talking machine, the combination with a stationary, substantially cylindrical sleeve, of a hollow sound box arm extending freely through said sleeve, a sound box carried by said arm, an annular carrier rotatably surrounding said sleeve, and a spring secured to said carrier and to said arm for supporting said arm in an operative position.

9. In a talking machine, the combination with a stationary substantially cylindrical sleeve, of a hollow longitudinally curved sound box arm extending freely through said

sleeve, a sound box carried by said arm, an annular carrier rotatably surrounding said sleeve, and a longitudinally curved spring secured to said carrier and to said arm for supporting said arm in an operative position.

10. In a talking machine, the combination with a stationary substantially cylindrical sleeve, of a hollow sound box arm extending freely through said sleeve, a sound box carried by said arm, an annular carrier rotatably surrounding said sleeve, a spring secured to said carrier and to said arm for supporting said arm in an operative position, and means for adjusting the position of said arm with respect to said spring to centralize said arm with respect to said sleeve when said sound box is in operation.

11. In a talking machine, the combination with a stationary substantially cylindrical sleeve, of a hollow longitudinally curved sound box arm extending freely through said sleeve, a sound box carried by said arm, an annular carrier rotatably surrounding said sleeve, a longitudinally curved spring secured to said carrier and to said arm for supporting said arm in an operative position, and means for adjusting the position of said arm with respect to said spring to centralize said arm with respect to said sleeve when said sound box is in operation.

12. In a talking machine, the combination with means provided with an aperture, of a hollow sound conveying arm extending through said aperture, a sound box carried

by said arm, an annular carrier surrounding said arm and rotatable with respect thereto, and a spring connecting said carrier and said arm for holding said arm in an operative position.

13. In a talking machine, the combination with means providing an aperture, of a hollow sound box arm extending freely through said aperture, a sound box carried by said arm, a carrier supported independently of said arm and freely rotatable with respect thereto, and a spring secured to said carrier and to said arm for supporting said arm in an operative position.

14. In a talking machine, the combination with means providing an aperture, of a hollow sound box arm extending freely through said aperture, a sound box carried by said arm, a carrier supported independently of said arm and freely rotatable with respect thereto, a spring secured to said carrier and to said arm for supporting said arm in an operative position, and means between said spring and said arm for adjusting the position of said arm with respect to said spring to centralize said arm with respect to said aperture.

Signed at city of Paris, in the Republic of France this fifth day of September, A. D. 1916.

EMILE PATHÉ.

Witnesses:

CHAS. P. PRESSLY,
D. H. SLAWSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH.

1,251,592 ----- R. Thomas.
Patented Jan. 1, 1918.
Filed June 8, 1916.

R. THOMAS.

PHONOGRAPH.

APPLICATION FILED JUNE 8, 1916.

1,251,592.

Patented Jan. 1, 1918.

3 SHEETS—SHEET 1.

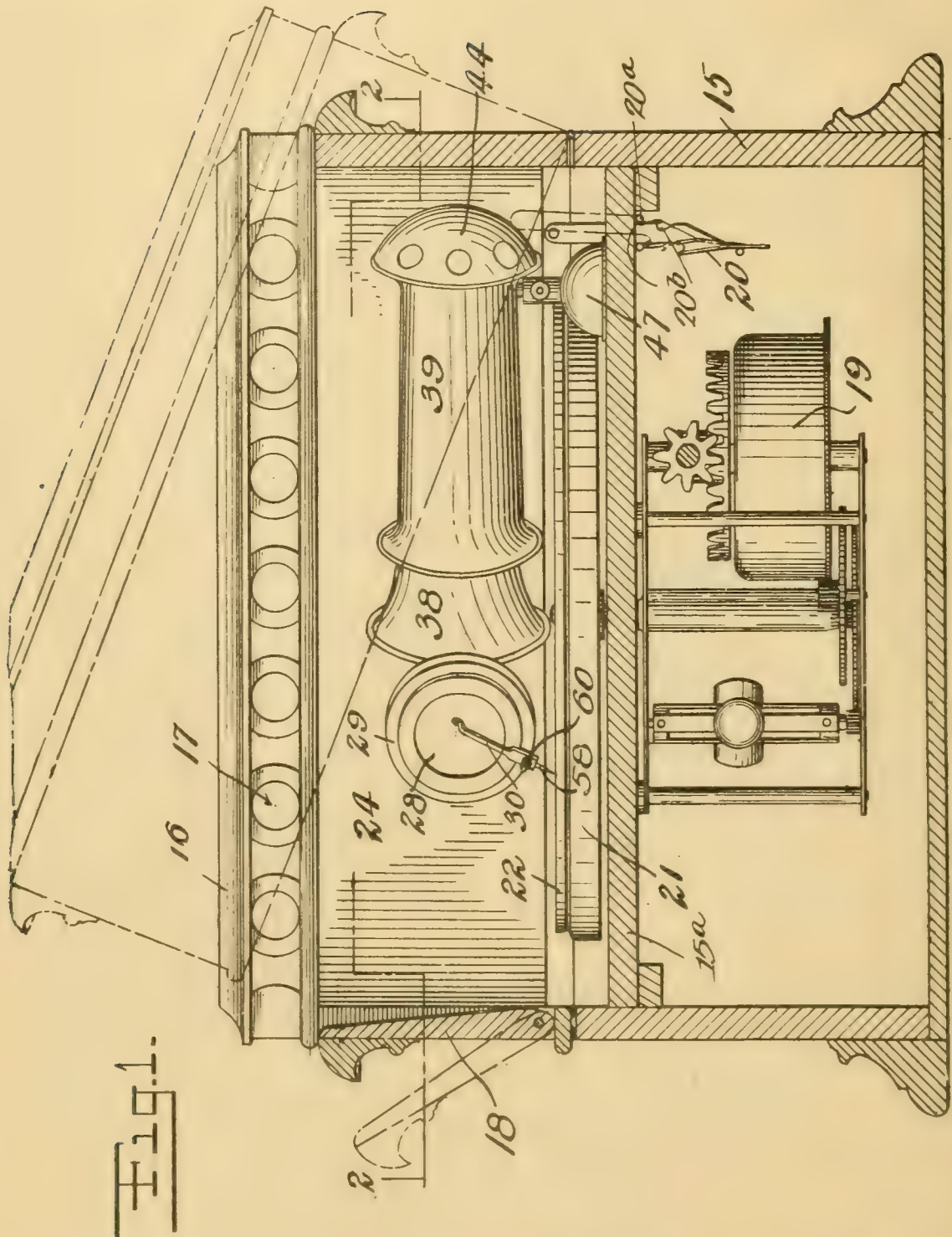


Fig. 1.

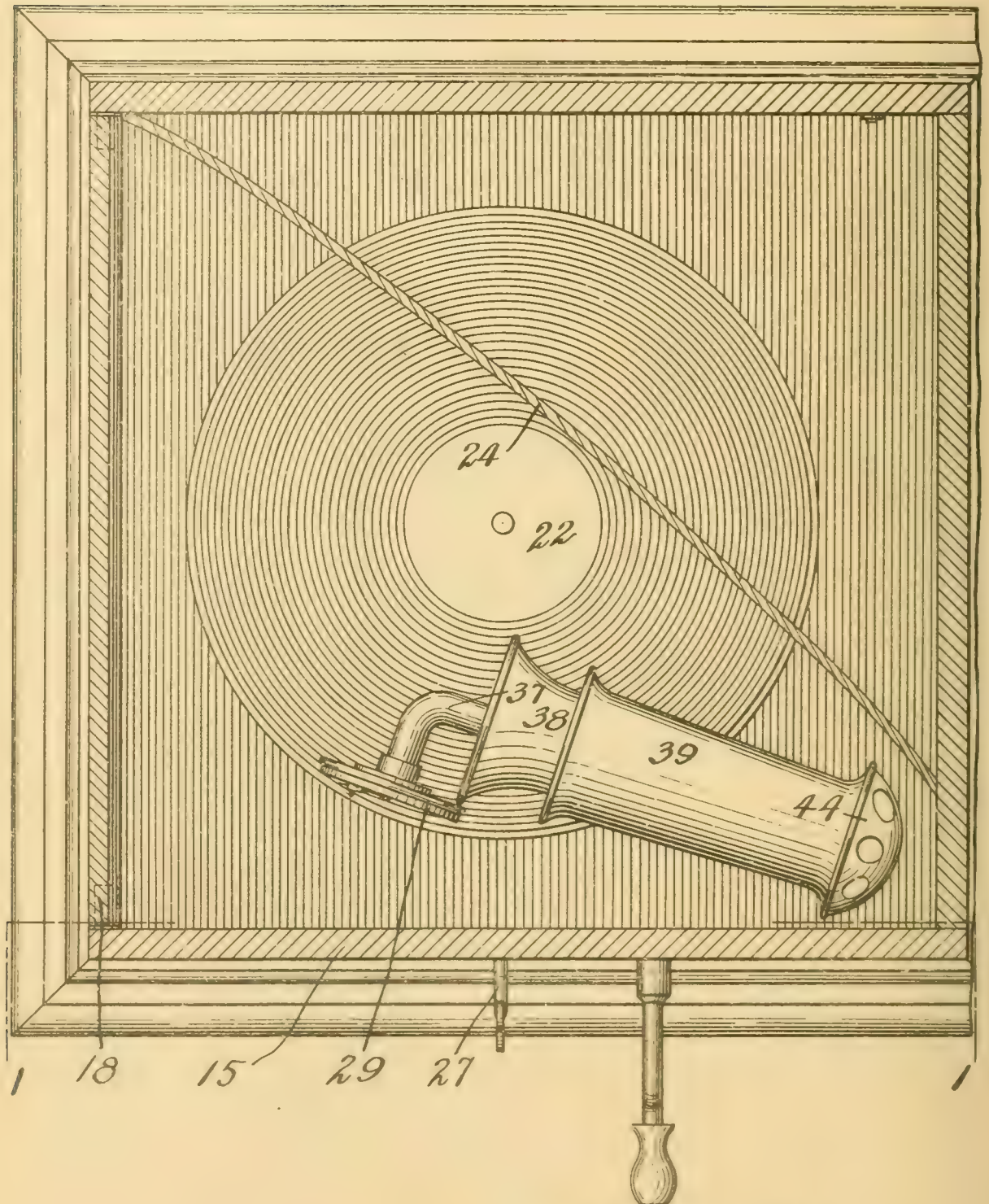
Reinhold Thomas Inventor
By his Attorney
Frank Kent

R. THOMAS.
PHONOGRAPH.
APPLICATION FILED JUNE 8, 1916.

1,251,592.

Patented Jan. 1, 1918.
3 SHEETS—SHEET 2.

Fig. 2.

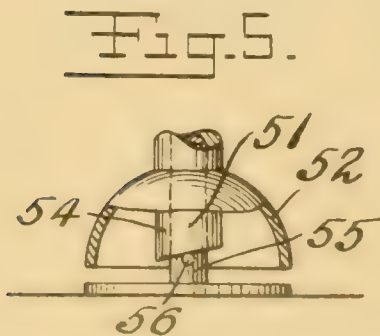
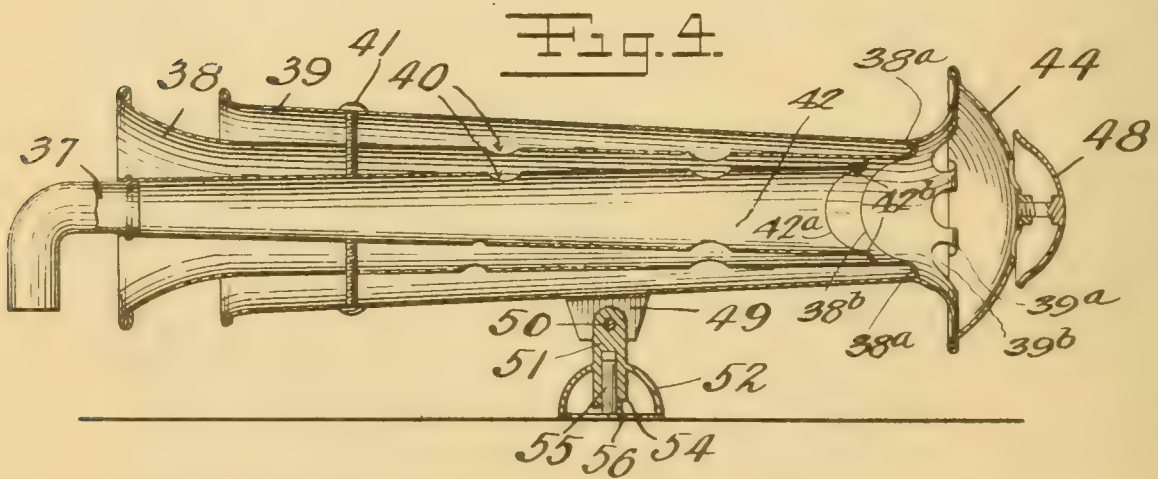
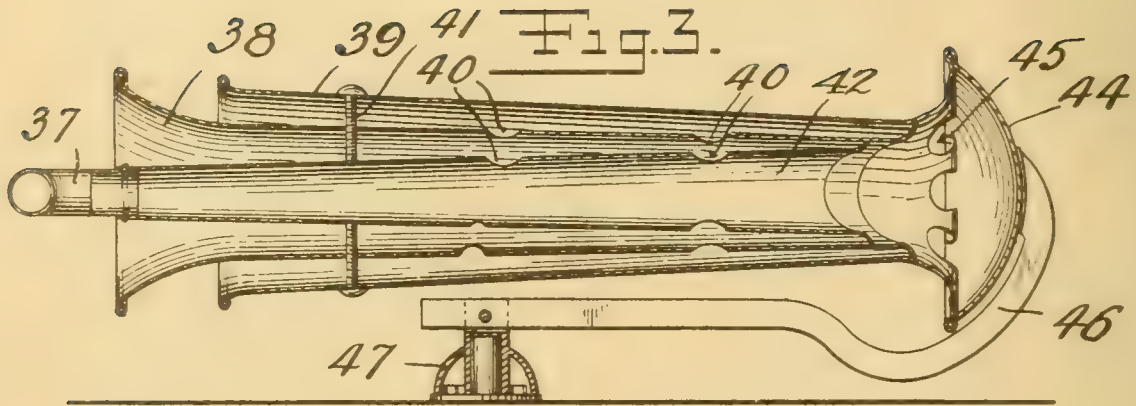


Inventor
Reinhold Thomas
By his Attorney
Frank Kent

1,251,592.

Patented Jan. 1, 1918

3 SHEETS-SHEET 3.



Reinhold Thomas
Inventor
Frank J. Hunt
Attorney

UNITED STATES PATENT OFFICE.

REINHOLD THOMAS, OF BROOKLYN, NEW YORK.

PHONOGRAPH.

1,251,592.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed June 8, 1916. Serial No. 102,377.

To all whom it may concern:

Be it known that I, REINHOLD THOMAS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

This invention relates to improvements in phonographs and has for its object to provide an improved type of reproducing device comprising sound box, tone arm and amplifier, mounted for moving as a unitary structure over the record. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:

Figure 1 is a sectional view on the line, 1—1, of Fig. 2, with parts in elevation illustrating a phonograph embodying this invention.

Fig. 2 is a plan view with parts in section on the line, 2—2, of Fig. 1, illustrating the subject-matter of Fig. 1.

Fig. 3 is a central longitudinal sectional view of a form of amplifier embodying the invention.

Fig. 4 is a similar view illustrating another form of amplifier.

Fig. 5 is a detail view illustrating a means for giving the amplifier bias toward movement in one direction.

In the drawings 15 is a box or casing comprising a horizontal tablet or partition, 15^a, below which there is mounted and carried a motor indicated at 19, (the specific structure of which is not material and which is intended to be shown only conventionally). The shaft of this motor is intended to be understood as extending up through the horizontal tablet, 15^a, for carrying and rotating above said tablet the record carrier, 21, on which there is shown a record, 22. Upon said horizontal tablet, 15^a, outside the circumference of the record carrier, 21, there is secured a vertical pivot post, 55, upon which there is mounted for horizontal rotation a pivot support for the entire sound-reproducing and amplifying device which is pivoted to said support for swinging vertically to carry the sound box and stylus thereon toward and from the record. In the form shown in Figs. 1 and 3 this pivot support comprises a sleeve, 51, fitted onto the pivot spindle, 55, having a bell-shaped flange or skirt, 52, whose lower margin is horizontal and positioned a little below the lower

end of the sleeve. The sleeve is beveled or spirally shaped at its lower end, and that end lodges upon a stud, 56, which projects from the pivot post, so that the weight of the parts carried by said pivot support, 51, namely, the sound conduit and sound box, tends to cause the sleeve and said parts carried thereby to rotate around the axis of the pivot post, 55, from a position at which the lowest point of said beveled or spirally-cut end of the sleeve bears on the stud, 56, to a position at which a higher point on said beveled edge bears on said stud. The purpose obviously accomplished by this expedient is to bias the entire horizontally-swinging structure in favor of swinging in one direction rather than in the other, so that the stylus carried by the sound box at the end of the structure is pressed against one side of the groove of the record, which in the case of the laterally-undulating type of record groove contributes to clearness of tone production, and is without any disadvantageous effect in the case of the vertically-undulating type of record groove. The purpose of the bell-shaped flange or skirt, 52, extending as stated below the level of the beveled lower end of the sleeve, 51, is to afford the device stable support out of playing position,—that is, when the reproducer is swung entirely off the record and stands at one side thereof.

The distinguishing characteristic of an instrument of the type herein shown, is that the amplifier or horn tube for conducting and magnifying the sound has the initial portion,—sometimes called the tone arm,—extending axially within the final portion, more commonly called the amplifier or horn, and that a reflector is provided at the end opposite the sound box for reflecting the sound waves emerging from that end of the inner member of the sound conduit or tone arm, back through the outer member, and also outside said outer member toward the end at which the sound box is mounted, the sound being delivered, therefore, at the same end of the device at which it is originated in the sound box by the vibrations of the diaphragm therein communicated by the stylus from the record. In the drawings there is shown a supplemental exterior member of, or addition to, the amplifier encompassing the member which itself encompasses the tone arm as stated. The several parts or members of the sound conduit above referred to will now be particularly identified.

The initial member of the sound conduit referred to as the tone arm is the tube, 42, which is preferably tapered from the end at which it is connected by the elbow, 37, with the sound box, 29, widening toward the farther end, which terminates within and a little back of the adjacent end of the next exterior member, 38, of the sound conduit, this latter member being sometimes referred to as the amplifier or horn proper. This horn member, 38, is tapered widening from the end remote from the sound box toward the end proximate the sound box, and at the last mentioned end is additionally more rapidly flared as more clearly seen in the drawing, for wide-spread delivery of the sound waves. The tone arm, 42, communicates with the horn member, 38, at the adjacent ends of said two members remote from the sound box, not only through the annular space between the two members resultant from the fact that the exterior diameter of that end of the tone arm, 42, is noticeably less than the interior diameter of the adjacent end of the horn, 38, but also by reason of the lateral recesses or notches, 42^a, which are formed at the larger end of the tone arm, 42, said notches extending each through nearly half of the circumference of that end of the tone arm, leaving only narrow segments, 42^b, between them at opposite sides which are taken advantage of for spacing the tone arm at that end definitely within the adjacent end of the horn, 38, which is done by turning out these narrow segments, 42^b, into touch with the inner surface of the encompassing horn member, 38. Further communication between the tone arm, 42, and the horn member, 38, is afforded by apertures, 40, which are made at intervals in the length of the tone arm, preferably rather nearer its wider end than its narrower end, so that the sound waves may emerge laterally from the tone arm for blending with the sound waves in the horn, which may be considered as originating therein at the smaller end, being communicated from the larger end of the tone arm. Facing the adjacent ends of the tone arm and horn member, 38, remote from the sound box there is a reflector, 44, suitably held in position co-axial with said tone arm and horn member by any convenient mechanical connection, such connection being most conveniently made with the outer of the two members, namely the horn member, and in the drawings in which there is shown an additional exterior amplifier or horn member, 39, encompassing the horn member, 38, and extending beyond it at the adjacent smaller ends of the said two horn members, the immediate support of the reflector, 44, is obtained by extending fingers, 39^a, from said smaller end of said exterior horn member, 39, as seen clearly in Figs. 3 and 4, some-

what similar fingers, 38^a, being extended from the end of the horn member, 38, to the inner surface of the horn member, 39, for spacing the latter horn member from the horn member, 38, and supporting it thereon, said horn member, 38, having at that end notches, 38^b, between said fingers for communication of the sound waves into said smaller end of said exterior horn member 39, both from the smaller end of the tone arm, 42, and from the reflector, 44. It is contemplated that in addition to the sound waves conducted and reflected back to the exterior horn member, 39, when it is present, some portions of the sound waves will also be directly reflected outside of said horn member through the apertures, 39^b, between the fingers, 39^a, of said horn member, 39, said exterior sound waves being distributed more widely than the sound waves emerging from the forward ends of the horn members, 38 and 39, with the effect of causing the sound reaching the ear of the listener to approximate more nearly to the sound of a voice or instrument speaking or being played in unconfined space, and thus contributing to the naturalness of the sound reproduction effected by the instrument as a whole. In addition to the connection between the several sound conduit members described which are at the smaller end, said sound conduit members are spaced apart and supported upon each other by means of screws, 41, inserted through the outermost horn member, 39, screwed through the horn member, 38, and impinging against the tone arm, 42, said screws being positioned relatively near the larger end of said horn members, as seen in Figs. 3 and 4. For communication of the sound waves from the horn member, 38, into the horn member, 39, in addition to the communication afforded at the smaller end of said horn members, apertures, 40, are formed in the horn member, 38, which are preferably approximately in transverse planes with the similar apertures, 40, in the tone arm, 42, for communication with the horn member, 38, as described.

The record and sound-reproducing device as an entirety are completely inclosable in a hinged lid or cover, 16, of box form, hinged to the casing at one lower edge for swinging upward, for convenience in applying and removing the record from the record carrier and attention to the sound box. Means, as a latch, 20, may be provided engaging an abutment, 20^a, on the case for sustaining the cover at different degrees of openness for modulating the sound discharge, the latch having a plurality of notches, 20^b, distributed along its length for this purpose. Other means for permitting the discharge and modulation of the sound may be provided in the cover, as, for ex-

ample, a multiplicity of apertures, 17, distributed around all sides of the cover near the top, and a swinging panel, 18, pivoted at its lower edge and adapted to be tilted outward at the upper edge, as indicated in Fig. 1. These means of modulation of the sound discharge are not claimed herein, being reserved for a divisional application. The drawings show the sound box, 29, connected by an elbow at the smaller end of the tone arm, the elbow being rotatable at its connection with the tone arm to turn the sound box from a position at which the stylus carried thereby is adapted to co-operate with the record of the so-called "zig-zag" type,—that is, having laterally sinuous sound grooves,—to a position at which it is adapted to coöperate with the record of the so-called "hill-and-valley" type,—that is, having vertically undulatory sound grooves. And in order to coöperate with these two types of records, the stylus arm, 30, not only has a stylus socket position for receiving the stylus, 58, extending in a plane parallel to the diaphragm of the sound box removably secured by a thumb screw, 59, but is also provided with a permanent stylus, 60, projecting at right angles to the stylus, 58, for engaging a record of the hill-and-valley type. These features of construction and mounting of the sound box, and provision of stylus in two positions, are not herein claimed.

In my co-pending application, Serial No. 64,214, filed November 30, 1915, there is shown a phonograph structure of the same general type as that shown in this application, the characteristic features of the type being claimed in that application, only the variations from that form which are embodied in the present application being the subject matter of my claims in this application.

I claim:—

1. In a sound-reproducing instrument, a sound conduit with two or more tubes, one within another, spaced apart and communicating with each other, the sound box mounted on one end of the innermost of said tubes, the outer tube or tubes being formed for sound discharge at the end toward the sound box, the inner tube being tapered widening from the sound box end toward the other end, and the outer tubes being tapered widening in the opposite direction.

2. In a sound-reproducing instrument, in combination with a sound conduit consisting of a series of concentric tubes, a sound-box

mounted on one end of the innermost of said tubes, said innermost tube being tapered widening from the sound box end toward the other end; an intermediate tube next exterior to the sound-box-carrying tube, being tapered widening in the opposite direction, and an exterior tube being also tapered widening in the same direction as said intermediate tube, and additionally flared at the discharge end toward the sound box, and a reflector encompassing the end remote from the sound box of said exterior tube.

3. A sound-reproducing instrument comprising in combination with a sound conduit, consisting of a series of concentric tubes; a sound box mounted on one end of the innermost of said tubes, all of said tubes being open at the opposite end, a reflector facing said open end of the tubes and extending more widely than said open ends, whereby the sound is partly reflected outside the outermost of said tubes.

4. A sound-reproducing instrument comprising in combination with a sound conduit, consisting of a plurality of concentric tubes; a sound box mounted upon one end of the innermost of said tubes, said innermost tube being tapered widening from the sound-box end toward the opposite end, and the exterior tubes being tapered widening in the opposite direction, each exterior tube being more widely tapered than the next interior, and the outermost tube being additionally flared at the discharge end toward the sound box, all of said tubes being open at the end opposite the sound box, and a reflector facing said open ends and being of greater diameter than the outermost of said tubes whereby a portion of the sound is reflected exteriorly of all the tubes back toward the sound box.

5. In a sound-reproducing instrument in combination with a sound conduit consisting of a plurality of concentric tubes comprising an innermost tube and the sound box mounted upon one end thereof; an intermediate tube tapered widening from the end opposite the sound box back toward the sound box, and an exterior tube tapered widening in the same direction, said concentric tubes being supported one upon another, a pivot support for the entire group of tubes and sound box, and means by which the outermost tube is pivoted upon said support for swinging horizontally and vertically.

In testimony whereof I affix my signature.
REINHOLD THOMAS.

TALKING MACHINES.

1,251,675 ----- A. A. Long,
Patented Jan. 1, 1918,
Filed Feb. 1, 1917.

1,251,675.

Patented Jan. 1, 1918.

Fig. 1.

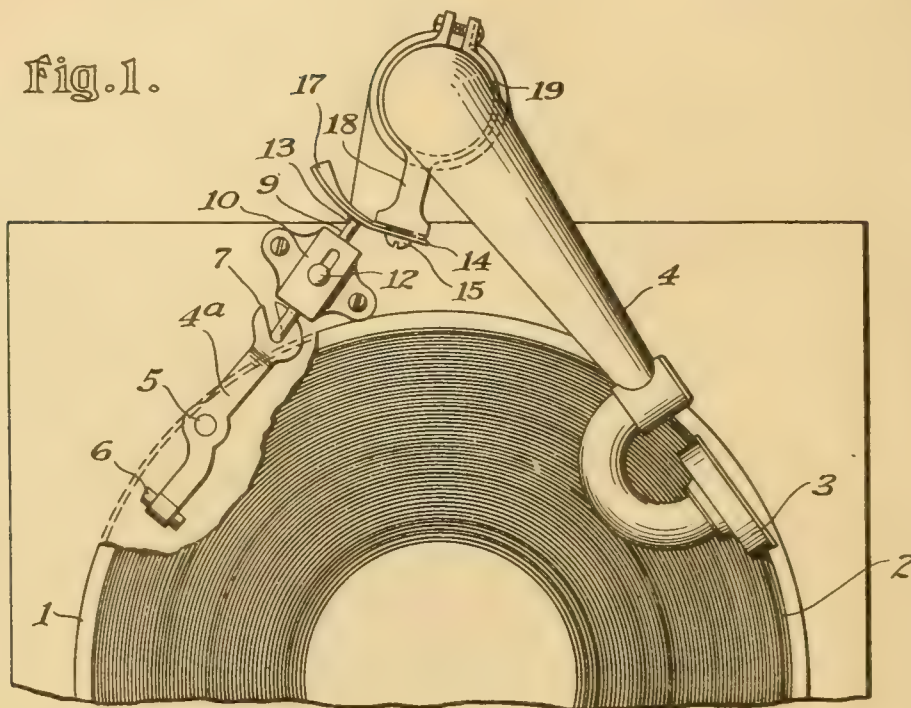


Fig. 2.

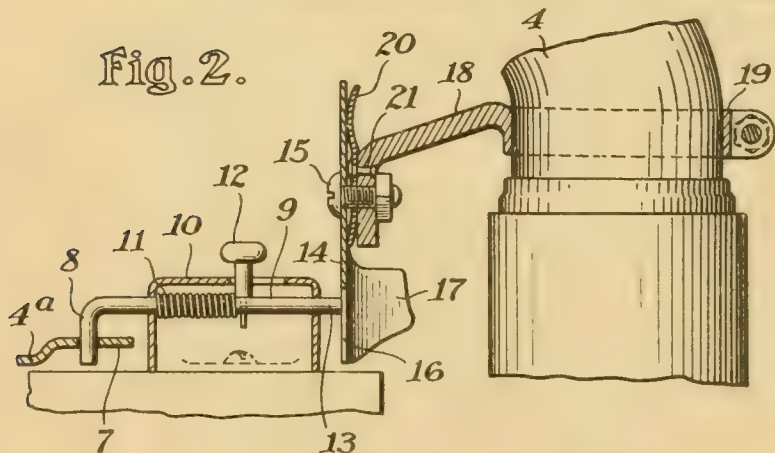


Fig. 3.

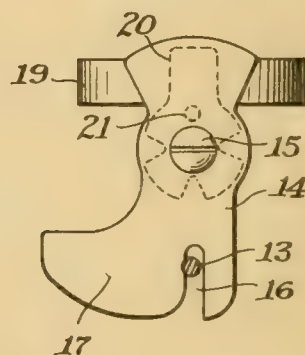


Fig. 4.

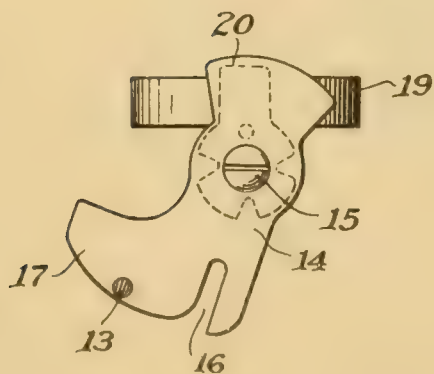
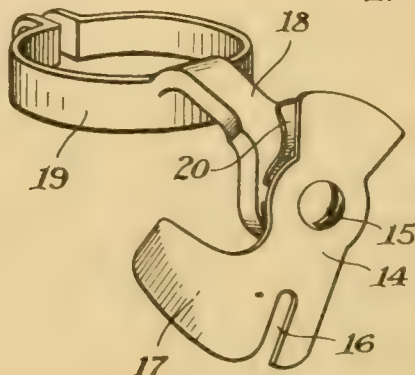


Fig. 5.



Inventor:

Adam A. Long
by Davis & Simms
his attorneys

UNITED STATES PATENT OFFICE.

ADAM A. LONG, OF ROCHESTER, NEW YORK.

TALKING-MACHINE.

1,251,675.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed February 1, 1917. Serial No. 145,876.

To all whom it may concern:

Be it known that I, ADAM A. LONG, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

The present invention relates to talking machines and more particularly to a stop mechanism therefor, an object of the invention being to provide an improved construction which may be set to stop the machine automatically when the end of the record is reached, such construction being inexpensive to manufacture, simple in operation, and easily adjusted.

To this and other ends, the invention consists in certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings:

Figure 1 is a plan view of a portion of a talking machine with the present improvements attached thereto;

Fig. 2 is a sectional view through the operating parts of the stop mechanism;

Fig. 3 is a detail view of the frictionally mounted releasing element for the brake, such element being shown with the co-operating element projected into its slot for coupling the elements together;

Fig. 4 is a view similar to Fig. 3, showing the manner in which the coöperating element engages the frictionally mounted element during the travel of the latter; and

Fig. 5 is a perspective view of the frictionally mounted element and its supporting means.

Referring more particularly to the drawings, 1 indicates the table of the talking machine, which as usual rotates to turn the record 2 so that the reproducer 3 may travel thereover, said reproducer being carried by the tone arm 4 which, in most instances, is mounted to oscillate in a horizontal plane. For stopping the rotary table or part 2, braking means may be employed comprising preferably a lever 4^a pivoted at 5 and having a friction surface 6 at one end for co-operation with the flange on the under surface of the rotary table. The other end of this brake lever may be provided with a slot 7 in which a downwardly turned arm 8 of a plunger 9 operates, the plunger 9 being

guided longitudinally within a housing 10 and surrounded by a coil spring 11 which acts on the plunger in a direction to throw the lever 4^a to a position where the friction device 6 will engage the flange of the rotary table 1. For moving the plunger 9 against the action of the spring 11, a thumb piece 12 may be arranged at the top of the casing 10 and connects with the plunger.

The releasing means for the brake comprises two elements, one connected with the brake and the other connected with the traveling or the oscillatory part of a talking machine. One of these elements is in the form of an extension 13 on the plunger 9 and the other is in the form of a frictionally mounted element 14 which is pivoted at 15 to turn about an axis at an angle to, and preferably perpendicular to, the axis of turning of the oscillatory member or, stated differently, lying parallel to the plane of travel of the oscillatory member 4. This member 14 is provided with a recess or slot 16 extending substantially radially to the turning axis of the member 14 and arranged eccentrically with reference to said axis. This member 14 also has a curved portion 17 to one side of the slot 16 for engagement by the element 13 in the manner to be described. Any suitable support may be provided for the element 13, that shown comprising an arm 18 carrying the screw 15 which forms the axis of the member 14, said arm being extended from a split clamping ring which is passed about the vertical portion of the tone arm 4 being held to said tone arm so as to turn with the latter. To hold the element 14 in any position to which it might be adjusted, the latter is engaged on its rear face by a friction producing device 20 which surrounds the screw 15 but is held against turning on the arm 18 by a pin 21.

In the use of this stop mechanism, the tone arm 4 is turned until the element or device 13 enters the opening 16 so that the elements 13 and 14 are interlocked after which the tone arm is turned until the needle is at the inner end of the record. The member 11 during this movement turns about the axis 15 due to the fact that the member 13 is stationary. When the inner end of the record is reached, the member 13 is withdrawn from the opening 16 and the tone arm is swung to the starting point of the record, carrying the member 11 therewith and causing the member to coöperate with

the curved portion 17 of the member 14, and the record to turn under the action of its motor. As the reproducing needle is moving over the record, the portion 17 of the member 14 travels over the end of the member 13, until the slot 16 is reached when the member 13 is projected into said slot under the action of the spring 11, and, at the same time, the brake portion 6 is thrown into contact with the flange of the rotary record support thus stopping the machine.

What I claim as my invention and desire to secure by Letters Patent is:

1. In combination with a rotary part and a traveling part of a talking machine, a brake for the rotary part, and means for controlling the operation of the brake embodying two cooperating elements, one connected to the brake and the other to the traveling part, and one of said elements being frictionally mounted to turn about an axis parallel with the plane of movement of the traveling part.

2. In combination with a rotary part and an oscillatory part of a talking machine, a brake for the rotary part, and means for controlling the operation of the brake embodying two cooperating elements, one connected to the brake and the other frictionally mounted on the oscillatory part to turn about an axis perpendicular to the axis of the oscillatory part, the cooperation between the elements taking place to one side of the axis of the frictionally mounted part.

3. In combination with a rotary part and a traveling part of a talking machine, a brake mechanism for the rotary part, and means for controlling the operation of said brake mechanism comprising a frictionally mounted element arranged to turn about an axis parallel with the plane of movement of

the traveling part and provided with an opening eccentrically arranged with reference to said axis, and an element controlling the brake, cooperating with the frictionally mounted element to one side of the opening to hold the brake against movement, and movable into the opening to release the brake and to interlock with the frictionally mounted element.

4. In combination with a rotary part, and a traveling part of a talking machine, a brake mechanism for the rotary part, an element movable with the traveling part, mounted to turn about an axis parallel with the path of travel of the traveling part, and provided with an eccentrically arranged recess, and an element connected to the brake and cooperating with the first mentioned element to one side of the opening during the movement of the traveling part, and movable into said recess to effect the operation of the brake to stop the rotary part.

5. The combination with a rotary part and a traveling part of a talking machine, a brake for the rotary part, a spring for moving the brake to braking position, a frictionally mounted element arranged to move with the traveling part, and to turn thereon about an axis substantially parallel with the plane of the path of travel of said traveling part, said element being provided with a recess to one side of its axis and with a curved portion to one side of the recess, and an element connected to the brake, cooperating with the curved part of the frictionally mounted element during the travel of the latter, and adapted to move into said recess to effect the operation of the brake to stop the rotary part.

ADAM A. LONG.

SOUND BOX ADJUSTMENT FOR TALKING MACHINES.

1,251,828 ----- L. K. Scotford,
Patented Jan. 1, 1918.
Filed Oct. 26, 1916.

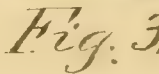
APPLICATION FILED OCT. 26, 1916.

Patented Jan. 1, 1918.

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By *Louis K. Scofield*
Sheridan, Wilkinson & Scott, Att'ys

Inventor:

UNITED STATES PATENT OFFICE.

LOUIS K. SCOTFORD, OF CHICAGO, ILLINOIS.

SOUND-BOX ADJUSTMENT FOR TALKING-MACHINES.

1,251,828.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed October 26, 1916. Serial No. 127,914.

To all whom it may concern:

Be it known that I, LOUIS K. SCOTFORD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sound-Box Adjustments for Talking-Machines, of which the following is a specification.

This invention relates to sound reproducing machines and particularly to the adjustment of the sound box of such a machine on the tone-arm or sound conveying tube.

The records or disks which are now in use in talking machines for effecting the mechanical reproduction of recorded sounds are of two types depending upon the character of the undulations of the record groove, namely, the vertically undulating or "hill-and-dale" and the laterally undulating or "zig-zag" types. For reproducing sounds with the vertically undulating type, it is essential that the diaphragm of the sound box be disposed in a plane extending across or transversely to the longitudinal axis of the tone-arm so that the vertical undulations on the record disk will cause a movement of the stylus lever in a substantially vertical plane and a consequent movement of the diaphragm; where the grooves of the records are of the laterally undulating or "zig-zag" type, it is desirable that the diaphragm of the sound box be disposed in a plane extending substantially parallel to the longitudinal axis of the tone-arm and preferably in a vertical direction so that the lateral vibration of the stylus or needle will cause corresponding lateral vibrations of the diaphragm. It will be seen therefore that in order to reproduce sounds from these two types of records, the talking machines must differ in construction or they must be provided with adjustable means, whereby the sound box may be adjusted to suit the record being used. An attempt has been made heretofore to solve this difficulty by making the sound box adjustable on the tone-arm, but such attempts have not met with success for the reason that when the sound box is moved from one position to another, the stylus has been varied in its spaced relation to the pivotal axis of the tone-arm, so that in one of the two positions of the sound box the stylus is located at such a distance from the pivotal axis of the tone-arm that it cannot travel across the disk or record in the path most suitable for a perfect reproduc-

tion of the sounds, and most suitable for relieving the stress upon the stylus when the machine is in operation. In order to reduce the stresses upon the stylus or needle, other than those produced by the recorded undulations of the record or disk such as are adapted to produce the vibrations which effect the reproduction of sound, it is desirable that the point of the stylus move in an arc or path extending across the disk or record through the axis of rotation thereof, so that the stylus is subjected at all times merely to the action of the undulations which constitute the record of the sounds, and not to any lateral stresses set up by the edges of the grooves on the disk or other influences, which might set up other vibrations which would interfere with the proper reproduction of the recorded composition.

The principal object of the present invention is to provide an improved talking machine comprising means for adjusting the sound box and stylus to either of two operative positions, in either of which the point of the stylus is the same distance from the pivotal axis of the tone-arm about which the tone-arm moves as the stylus moves across the record. Another object is to provide means for adjusting the sound box in different positions on the tone-arm so that the diaphragm thereof may be disposed in the proper position for either of the two types of records above mentioned, and to provide means for effecting this adjustment while maintaining the stylus or needle and the bore of the needle holder coincident with the axis of the end of the tone-arm to which the sound box and parts carried thereby are attached. Still another object is to provide a sound box and tone-arm having a detachable coupling for connecting the same, whereby the sound box may be adjusted to either of two operative positions, in either of which the stylus will be coincident with the axis of the coupling by which the sound box is connected to the tone-arm. A further object is to provide an improved adjustable sound box carrying a stylus which will be located at all times in a plane containing the pivotal axis of the tone-arm. A further object is to provide a tone-arm having a tubular extension telescopically engaging the same and connected to the sound box, whereby the telescoping parts may be disengaged to move the sound box from one to the other of two operative positions of the same with

respect to the tone-arm, in either of which positions the stylus is located substantially the same distance from and in a plane containing the pivotal axis of the tone-arm. A further object is to provide an improved construction and arrangement of parts whereby a single sound reproducing apparatus may be adapted for use with either of the two types of records above mentioned.

These and other objects of the invention will appear more clearly from the following specification taken in connection with the accompanying drawings, in which one embodiment of the invention is illustrated.

In the drawings—

Figure 1 shows a side elevation of a tone-arm and sound box embodying the features of my invention, the sound box being in the position required for the reproduction of sounds from a record of the vertically undulating type.

Fig. 2 is a side elevation of the construction shown in Fig. 1 after the sound box has been moved to a position adapted to a reproduction of sounds from a record having grooves of the laterally undulating type.

Fig. 3 is a perspective view of the telescoping parts which form the detachable coupling, by means of which the sound box is adjusted in its relation to the tone-arm.

Fig. 4 shows an end elevation of the sound box and tone-arm when adjusted as shown in Fig. 1; and

Fig. 5 shows an end elevation of the sound box and tone-arm when adjusted as shown in Fig. 2.

In the drawings the numeral 10 designates the tone-arm of a sound reproducing instrument, having the enlarged transversely disposed end 10^a thereof pivotally mounted in a suitable bearing 11 to swing about the pivotal axis 12, and having adjacent the smaller end thereof an angularly disposed tubular part 13. The tone-arm is provided with a tubular extension 14, which is connected at its lower or outer end to the sound box 15, and which is adapted to have a telescoping engagement at its upper end with the angularly disposed part 13 of the tone-arm. The lower extremity of the part 13 is thickened to form a rim or flange 16, adapted to pass around the outside of the extension 14 to form a relatively tight frictional engagement therewith, the end of the extension 14 being adapted to engage the annular shoulder 16^a within the flange 16. This flange 16 is provided with two longitudinal slots 17 which are disposed substantially 90° apart and which extend upwardly from the end of the flange to receive the clamping thumb screw 18, which has a threaded engagement with the extremity of the extension 14, and which is adapted to pass into one of the slots 17 when the extension 14 is passed into a telescoping engage-

ment with the angularly disposed part 13 of the tone arm. The relative location of the slots 17 and of the sound box 15 on the extension 14 of the tone-arm, is such that when the clamping screw 18 is engaging one of the slots, the diaphragm 19 of the sound box will be disposed in a plane extending across the longitudinal axis of the tone-arm; while, when the screw 18 is engaging the other of the slots 17, the diaphragm 19 will lie in an upwardly directed plane substantially parallel to the longitudinal axis of the tone-arm.

The diaphragm of the sound box is actuated by and operatively connected to the stylus arm or lever 20, which comprises a hub 21 pivotally mounted between the lugs or flanges 22, projecting downwardly from the sound box, by means of the bearing pins or screws 23. The hub 21 carries the needle holder 24 having a bore adapted to receive the needle or stylus 25 which may be held in fixed adjusted position in the needle holder by means of the locking nut 26 and which bears upon the record disk 27. These parts are so located and constructed that the bore of the needle holder 24 is disposed at an angle to the plane of the sound box and the diaphragm and lies in a plane containing the arm 20^a of the stylus lever. The plane of the diaphragm is also inclined to the axis 28 of the part 13 of the tone-arm. These parts are further so proportioned and arranged that when the sound box is in either of the two positions illustrated in Figs. 1 and 2, the bore of the needle holder and the needle or stylus carried thereby will be coincident with the axis 28 of the telescoping parts 12 and 13, which form the detachable coupling, by means of which the adjustment of the sound box on the tone-arm is permitted. It will also be apparent that in either position of the sound box the point of the needle 25, which coacts with the record 27, will be the same distance from the vertical pivotal axis 12 of the tone-arm, about which axis the tone arm moves as the stylus travels over the record during the operation of the sound reproducing machine, and that the needle and needle holder will always lie in a plane containing the pivotal axis 12 of the tone arm.

In the operation of this improvement, the sound box may be adjusted with respect to the tone-arm in order to provide the proper arrangement for the kind of record being used, by releasing the clamping screw 18, passing the tubular extension 14 out of engagement with the angularly disposed part 13, and then replacing the part 14 on the part 13 after the same has been moved to a position displaced 90° from its preceding position, whereby the screw 18 will engage the other of the slots 17. Then, after tightening the screw 18, the parts will be held in

fixed relation for use with the particular kind of record being used. In either position of the sound box and stylus or needle, the axis of the needle will be coincident with the axis of the tubular extension 14 and angularly disposed part 13, and the point of the needle will be at a constant distance from and in a plane containing the pivotal axis 12 of the tone-arm, so that if the parts are suitably proportioned and located in the initial construction, the point of the needle will always travel across the record in a path passing substantially through the center of the record regardless of the kind of record being used.

Although I have shown and described a particular form of the invention for purposes of illustration, it will be understood that it may be embodied in various other forms without departing from the spirit of the invention as defined in the appended claims.

What I claim is:

1. In a talking machine, a tone-arm having a tubular extension, a sound box connected to said tubular extension and containing a diaphragm, a coupling for permitting said sound box to be moved to either of two operative positions with respect to the tone-arm, the plane of said diaphragm being inclined with respect to the axis of said tubular extension, a needle holder having a bore to receive a needle, said bore

being inclined with respect to the plane of said diaphragm and alining with the axis of said tubular extension in both positions of the sound box, and means for operatively connecting said needle holder and diaphragm.

2. In a talking machine, a tone-arm having a tubular extension, a sound box having a diaphragm therein inclined with respect to the axis of said tubular extension, a tubular member attached to said sound box, said tubular member and said tubular extension on the tone-arm having a telescopic engagement, one of said last mentioned members being provided with two slots extending substantially longitudinally of said tubular member, a clamping member carried by the other of said members and adapted to engage either of said slots, thereby permitting said tubular member to be removed from said tubular extension and replaced thereon with said clamping member engaging either of said slots, a needle holder having a bore to receive a needle, said bore being inclined with respect to the plane of said diaphragm and alining with the axis of said tubular extension in both positions of the sound box, and means for operatively connecting said needle holder and diaphragm.

In testimony whereof I have subscribed my name.

LOUIS K. SCOTFORD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

METHOD OF MAKING SPYLI, etc.

1,251,907 ----- W. W. Moyer,
Patented Jan. 1, 1918,
Filed Dec. 11, 1915.

W. W. MOYER.
METHOD OF MAKING STYLI, &c.
APPLICATION FILED DEC. 11, 1915.

1,251,907.

Patented Jan. 1, 1918.
2 SHEETS—SHEET 1.

Fig. 1

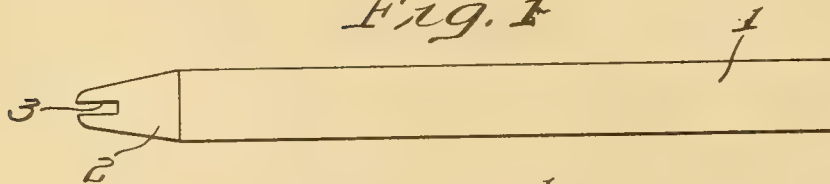


Fig. 2



Fig. 3

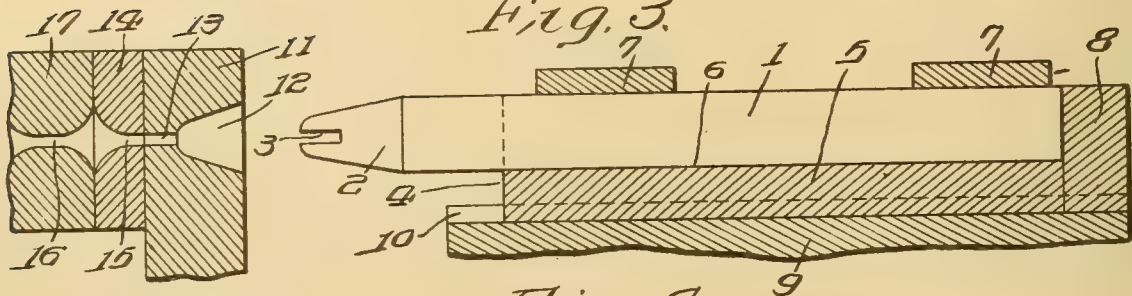


Fig. 4

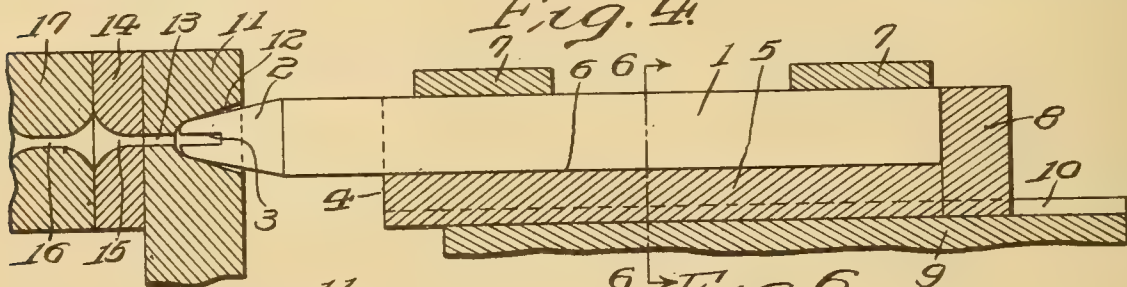


Fig. 5

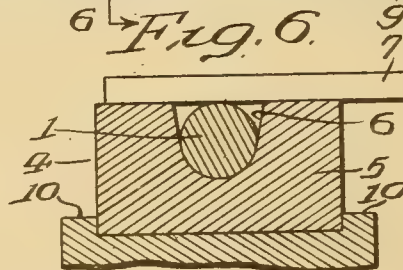
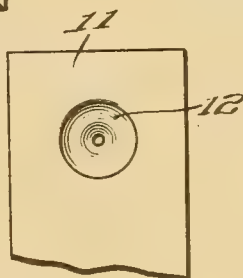
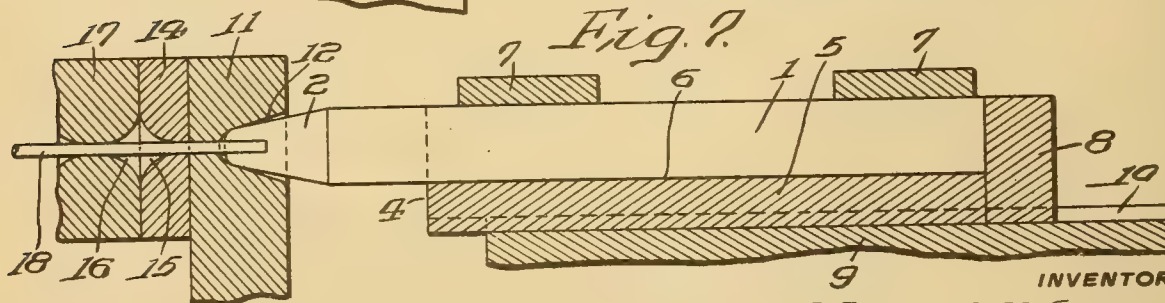


Fig. 7



WITNESS

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METHOD OF MAKING STYLI, &c.
APPLICATION FILED DEC. 11, 1915.

1,251,907.

Patented Jan. 1, 1918.
2 SHEETS—SHEET 2.

Fig. 8.



Fig. 9.

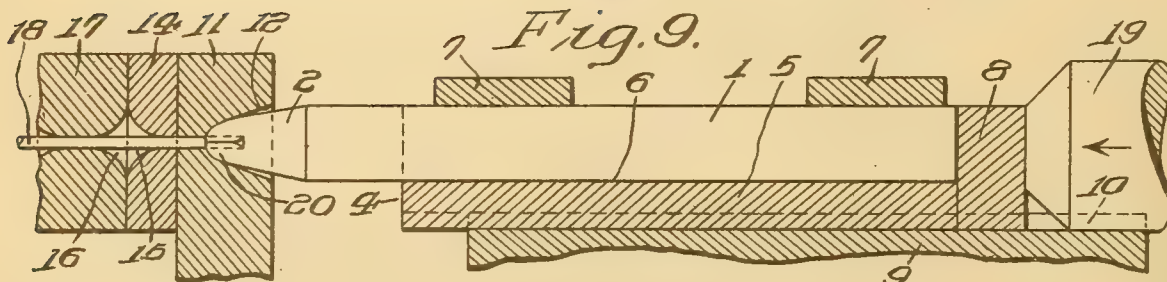


Fig. 10.

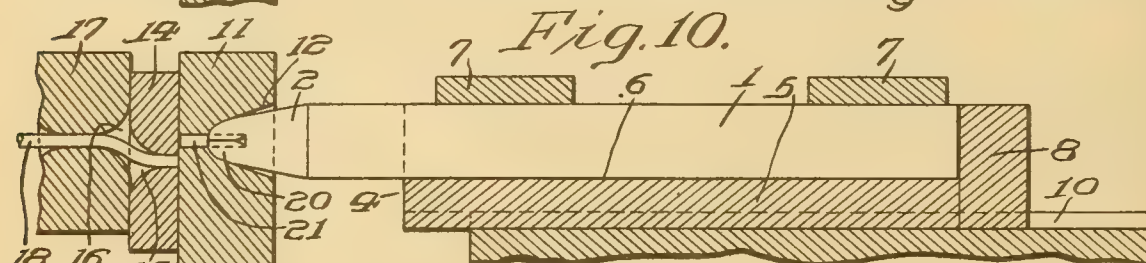


Fig. 11.

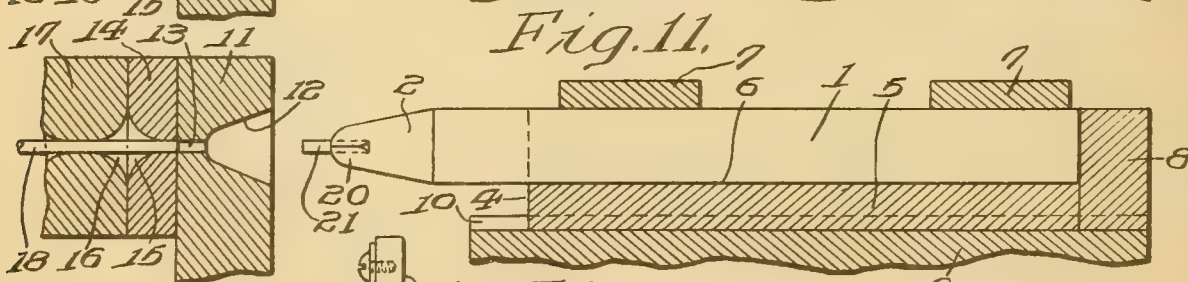


Fig. 12.

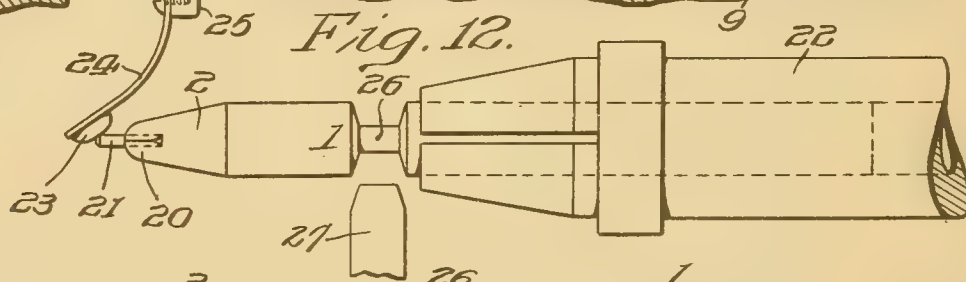


Fig. 13.

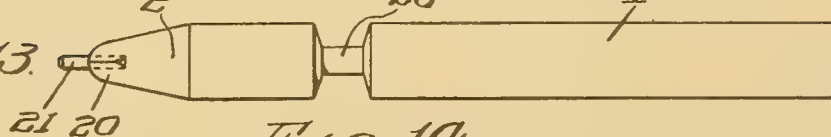
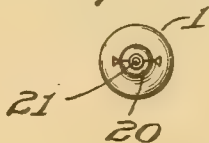


Fig. 14.



INVENTOR

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Fruton & Blount

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WITNESS

H. J. Hartman.

BY

UNITED STATES PATENT OFFICE.

WILLIAM W. MOYER, OF CAMDEN, NEW JERSEY, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

METHOD OF MAKING STYLI, &c.

1,251,907.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed December 11, 1915. Serial No. 66,260.

To all whom it may concern:

Be it known that I, WILLIAM W. MOYER, a citizen of the United States, and a resident of Camden, county of Camden, and State of New Jersey, have invented certain new and useful Improvements in Methods of Making Styli for Use in Connection with the Reproduction of Sound from Talking-Machine Records, of which the following is a specification.

It has been discovered that tungsten or tungstenic material is peculiarly adapted for styli or needles of sound reproducing machines. A stylus composed of tungsten or tungstenic material exhibits properties differing in a marked degree from styli of other materials. Among the characteristics are that a stylus of tungsten or tungstenic material has little injurious effect upon the walls of the sound record groove during the reproduction of the sound from a record, and may be used, a large number of times and on different records without injuriously affecting the walls of the sound record groove. It also appears to rapidly wear, at first, until its sides, in engagement with the sound record groove, fit and conform to the shape of the groove, after which the wear is negligible or inappreciable throughout the reproduction of sound from the remainder of the groove of the record.

Tungsten is, however, a difficult material to work, particularly when it is in the form of a wire, the diameter of which is equal to the width of a sound record groove. Tungsten wire is brittle and tends to split. It is also expensive. Since only a very small portion of a stylus is in actual contact with the sound record groove in reproducing sound from a record, it is obviously desirable to employ as little of it as possible. If, therefore, a steel shank be provided with a tip of tungsten or tungstenic material to engage and cooperate with the walls of the sound record groove, substantially all of the desirable properties of tungsten and tungstenic materials, as applied to this art, are utilized, and the present invention has for its purpose the making of a stylus having a shank of cheaper more easily worked ma-

terial and a record engaging tip or point of tungstenic material firmly and permanently united therewith or attached thereto.

Referring now to the drawings forming a part of this specification in which the same reference characters are employed to designate the same parts throughout the various views, Figure 1 is a side elevation of a rod or wire of malleable metal tapered and slotted at one free end, the same being of a size adapted to form with the shank or body portion of a stylus for sound reproducing machines. In actual practice, the shank or body portion is less than one one-sixteenth of an inch in diameter, and about three fourths of an inch long. For the sake of clearness, the drawings are made on a greatly enlarged scale throughout the various views.

Fig. 2 is an end view of the shank or body portion illustrated in Fig. 1.

Fig. 3 shows the shank or body portion of malleable wire held in a suitable slidable carrier and positioned in alinement with a die of hard steel.

Fig. 4 shows the stylus body, together with its carrier moved to bring the end of the stylus into engagement with the die.

Fig. 5 is an end front view of the die showing the cupped recess therein, and the small aperture at the bottom through which the tungsten wire is adapted to be threaded.

Fig. 6 is a cross-sectional view on the line 6-6 of Fig. 4 showing the carrier in which the body or shank of the stylus is positioned, held and moved during the practice of the steps of the process of this application.

Fig. 7 is a view similar to Fig. 4 but in which the tungsten wire has been inserted in the slot in the free end of the shank or body portion of the stylus.

Fig. 8 is an end view of the stylus showing the tungsten wire held in position as indicated in Fig. 7.

Fig. 9 indicates the next step of the process which consists in imparting to the carrier, and to the stylus body or shank carried thereby, a sharp blow, or a succession of blows, to force the tapered end of the malleable steel wire into the bottom of the

cup-shaped die to swage the tapered end of the shank and make it conform in shape to the bottom of the die, to close the slot at the sides of the tungsten wire insert, and to force the metal of the end of the shank into tight gripping engagement with the tungsten wire insert.

Fig. 10 shows the cutting or severing of the tungsten wire at a short distance from the point where it protrudes from the shank or body portion.

Fig. 11 shows the carrier moved back from the die, and the stylus shank or body with the tungsten wire tip swaged therein.

Fig. 12 illustrates diagrammatically the grinding of the sharp free edge of the tungsten wire tip to slightly bevel the same and remove any burrs or sharp edges which might be thereon.

Fig. 13 indicates the completed stylus, and Fig. 14 is a front end view of the same.

In carrying out the invention, a piece of straight wire of substantially the length of a talking machine stylus or needle is tapered or beveled at one of its ends and slotted to form a shank or body portion 1, such as is shown in Fig. 1. This body or shank is of preferably a malleable wire, such as soft steel, is about one sixteenth of an inch in diameter and substantially three fourths of an inch long. The shank, shown in Fig. 1, is preferably made on any suitable screw making machine. The shank or body portion 1 so formed is thus provided with a tapered end 2 and a transverse narrow slot or kerf 3. The width of this slot, channel or kerf is very small, preferably substantially six one thousandths of an inch, that is to say its diameter is substantially equal to the width of a sound record groove in a commercial sound record tablet.

The shank or body portion 1 thus formed is then preferably placed in a suitable holder or carrier 4, which preferably consists of an iron or steel block 5 having a groove or channel 6 in the top face thereof, the width of said groove 6, being substantially the same as the diameter of the shank or body portion 1. The bottom of the groove 6 is semi-circular and of a radius equal to the radius of the shank or body portion 1. In this way, the under half of the shank or body portion 1 will snugly fit into the bottom of the channel or groove 6 throughout the length of the block 5 and its top surface will be exactly on a level with or a trifle above the top surface of the block 5. Any suitable holding straps or fingers 7—7 may then be arranged to slide over the top of the block 5 to firmly hold or clamp the body portion or shank 1 seated in said groove. The said carrier 4 is preferably provided at its rear end with a hard steel anvil 8, made unitary with the block or carrier 5 in any suitable manner,

and the shank or body portion 1 is held in the carrier with its rear end squarely seated against the block or anvil 8.

The carrier 4 is preferably relatively freely slidable on a base or support 9 between guides 10—10 arranged parallel to the axis of the groove 6 in the block 5. In alinement with the axis of the shank or body portion 1, when it is seated in the groove 6, as above described, is a die 11 of hard steel, the same having a cup-shaped recess 12 in that face nearest the end of the shank or body portion 1. At the bottom of the recess 12 in the die 11 is a small opening 13 in axial alinement with the cup-shaped recess 12, said opening 13 being preferably of a diameter substantially equal to the width of the slot 3.

Against the rear face of the die 11, a cutting blade 14 bears tightly and is provided with a passage 15 therethrough. Said passage 15 is substantially the same diameter as the opening 13 at its end adjacent the die 11, and its opposite end is larger and preferably tapers rearwardly to register with a similar but oppositely tapered opening or passage 16 in the rear block or guide 17.

Said die 11 is preferably rigidly mounted on any suitable rigid base or support. The cup-shaped recess 12 and the openings or passages 13, 15 and 16 are normally in axial alinement with the axis of the shank or body portion 1 when the same is seated in the groove 6 of the block 5 as clearly shown in Fig. 3.

After having been positioned in the manner indicated in Fig. 3, the carrier or holder 4 is moved toward the die 11 to bring the tapered slotted end 2 of the shank or body portion 1 into engagement with the interior of the cup-shaped recess 12 of the die 11 as indicated in Fig. 4. In this stage or step of the process the end of the shank 1 does not quite reach or engage the extreme bottom of the cup-shaped recess, but the edge of the smaller end of the tapered portion 2 rests against the walls of the recess 12.

A length of tungsten wire 18 is then fed or advanced through the openings 16, 15 and 13 until its free end engages and seats on the bottom of the slot 3. The opening 13, the width of the slot 3, and the narrow or constricted parts of the passages or openings 15, and 16 are preferably of substantially the same diameter as that of the tungsten wire 18, that is to say, of substantially the size of the width of the groove of a commercial sound record tablet. The tungsten wire just passes freely through said openings. In Fig. 7 is indicated the above described step in which the tungsten wire 18 has been passed through the opening 16 in the guide 17, in the guiding blade 14 and in the die 11, and its free end is in engagement with the bottom of the slot 3 of the shank or body

portion 1. In Fig. 8 the tungsten wire 18 is shown to be in the slot 3 and in axial alignment with the axis of the shank or body portion 1.

5 A sharp blow is then imparted to the carrier or holder 4 and through the holder or carrier 4 to the shank 1, by a hammer 19, of any suitable type actuated in any suitable manner by any suitable means. The hammer
10 19 drives the slotted and tapered end 2 of the shank or body portion 1 of the stylus into the bottom of the cup-shaped recess 12 in the die 11. This blow swages the tapered end 2 to the tungsten wire. It causes the tapered
15 end to conform to the curved bottom of the recess 12, closes the slot 3 on each side of the tungsten wire 18 and compresses the metal of the tapered end 2 of the shank tightly against the tungsten insert. In this
20 manner, the free end of the tungsten wire 18 is firmly and rigidly secured to and made substantially unitary with the tapered end 2 of the shank or body portion 1. While the blow is being imparted by the hammer
25 19 to the holder 4 (and thereby to the shank or body portion 1) the tungsten wire 18 is substantially free to slide or move with the shank 1, sliding slightly through the openings 13, 15 and 16, that is to say, the tungsten
30 wire is not held clamped in the die 11 nor in the cutting blade 14, nor in the guide or support 17. The tungsten wire is preferably held yieldingly pressed against the bottom of the slide on the channel 3 when the blow
35 is imparted to the shank 1 by the hammer 19, so that it is not bent or broken by the advance of the stylus shank into the die. As a matter of fact, the advance of the carrier or holder 4 and the shank or stylus 1
40 toward the die 11 as the result of the blow by the hammer 19 is very slight, but it is sufficient to shape the tapered end 2 on the shank or body portion 1 and make it conform to and take the shape of the bottom
45 of the cup-shaped recess 12, and to close the slot 3 substantially completely around the tungsten wire 18, and to force the malleable metal of the tapered end 2 into very tight engagement with the tungsten wire 18.
50 The tapered end 2 of the shank or body portion 1 of the stylus having thus been swaged around the free end of the tungsten wire, the cutting blade 14 is then given a motion transversely to the axis of the tung-
55 sten wire 18 to shear off the tungsten wire at a short distance from the swaged and tapered end 20 of the shank or body 1. The distance from the bottom of the cup-shaped recess 12 to the rear face of the die 11 is made
60 equal to the distance that the tungsten wire is to protrude from the end of the shank or body 1 in the finished stylus. Since it is not desired to cut the tungsten wire between the cutting blade 14 and the guide or block

17, the passages 15 and 16 are tapered at 65 this point in order to permit the tungsten wire to freely bend without breaking or severing. The cutting blade 14 is then operated to sever the tungsten tip which has been swaged to the shank 1. 70

After the blade 14 has severed the tungsten wire 18, the carrier or holder 4 is moved rearwardly away from the die 11, carrying with it the substantially completed stylus, now comprising a shank or body portion 75 1 having a tapered end 2, the outer extreme end of which, 20, is tightly swaged around and firmly grips and holds a tungsten wire tip 21, the diameter of which tip is substantially equal to the width of a sound 80 record groove.

The next step in the process is to bevel or round off the edge of the free end of the tungsten tip 21, and to thereby remove any bur which might be present on the said end 85 as a result of the shearing of the tungsten wire inasmuch as such a bur might scratch or injure the walls of a sound record groove. This may be effected by placing the shank or body portion of the stylus in a rapidly 90 rotating chuck and bringing the free end of the tungsten tip 21 projecting therefrom against any grinding or abrasive agent. This may be accomplished by mounting a piece of abrasive 23 (such as Arkansas 95 stone) on the free end of a spring secured to any suitable support 25 and holding the end of the tungsten tip 21 against it while the stylus is being rapidly rotated in the chuck 22. Any grinding means, however, 100 may be substituted therefor, such as inserting the end of the tungsten tip, while the stylus is being rotated, into a conical recess in an abrasive block, or by replacing the block of abrasive held mounted on the free 105 end of the spring, (as diagrammatically shown in Fig. 12) with a rapidly rotating abrasive wheel.

A side elevational view of the finished stylus is indicated in Fig. 13 and an end 110 view of the same is shown in Fig. 14. It is to be observed that the slot 3 in the original shank or body portion 1 has been tightly closed by this swaging process and that only a slight mark appears on the tapered sur- 115 face of the shank or body portion at the bottom of the groove or channel. All the metal of the swaged end 2 is tightly closed around the tungsten wire, and the tungsten wire is substantially unitarily united with 120 the swaged end of the shank or body portion 1.

In order to increase, regulate or vary the degree of flexibility of the stylus for the purpose of diminishing or modifying the 125 volume and other qualities of the sound reproduced by the use of the stylus of this invention, (*i. e.* for making soft toned or

half tone needles), the shank or body portion 1 may be provided with a reduced portion 26. To accomplish this, the metal of the shank may be turned to as small a diameter as may be desired with any suitable metal-cutting tool 27 and this step may be performed simultaneously with the beveling or grinding of the free end of the tungsten tip. It may, however, be done after the tip has been beveled.

For loud toned or full tone needles or styli, this step of providing the shank with the reduced portion 26 may be omitted.

This application is not to be construed as limited to any particular mechanism for performing the steps above set forth and inasmuch as various machines and mechanisms may be constructed for performing the steps of the process, and any means may be employed for forcing the tapered end 2 of the shank 1 into the die, whether the same consists of means for imparting to the shank a blow, or a series of blows, or a slow substantially continuous high pressure, provided the tapered end of the shank or body portion is thereby made to inclose the tungsten insert so firmly and tightly as to make the said insert substantially unitary with the shank or body portion.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. The method of making a sound reproducing stylus of two metal parts which consists in providing the end of a rod of malleable metal forming the shank with a recess, inserting a length of wire forming the tip in said recess, and swaging the end of said malleable rod to close said recess around said wire by endwise and lateral pressure to thereby permanently secure said wire to said rod.

2. The method of joining a tip to a shank to make a sound reproducing stylus which consists in providing a shank of malleable metal with a tapered end, providing a recess in said tapered end, inserting and holding the tip forming material in said recess, and swaging the end of the malleable shank by endwise and lateral pressure to permanently secure the tip to said shank by closing the recess in the shank around the tip.

3. The method of joining a tip to a shank to make a sound reproducing stylus which consists in providing the end of a malleable metal rod with a recess, inserting a length of wire in said recess, swaging the end of the malleable metal rod around said wire by

endwise and lateral pressure to permanently secure said wire in said metal, and cutting off said wire a short distance from the end of the metal rod.

4. The method of joining a metal tip to a shank to make a sound reproducing stylus which consists in providing the end of a rod of malleable metal with a recess, inserting and holding a length of wire in said recess, swaging the end of the malleable metal by endwise and lateral pressure to close said recess around said wire, cutting off the wire at a short distance from the point where it protrudes from the end of the malleable rod and beveling the free end of said wire tip.

5. The method of joining a tip to a shank to make a sound reproducing stylus which consists in providing a length of malleable metal forming the shank with a recess, inserting a length of wire forming the tip in said recess, swaging the end of the shank around the tip by endwise and lateral pressure to permanently secure the tip of the shank, cutting off the tip a short distance from the end of the shank, and providing the shank with a reduced portion to form a neck in the shank adjacent the tipped end thereof.

6. The method of joining a tip to a shank to make a sound reproducing stylus which consists in transversely slotting the free end of the rod of malleable metal to form an open kerf, inserting and holding a length of wire of substantially the same diameter as the width of said kerf into said kerf with the end of the wire seated against the bottom of said kerf and with the axis of the wire in substantially co-axial alinement with the axis of said malleable metal, confining the kerfed end of said rod against lateral movement, and delivering an endwise blow to said metal while thus confined to thereby swage the kerfed end of the rod around the wire to tightly unite the tip to the shank.

7. The method of joining a tip to a shank to make a sound reproducing stylus which consists in providing a rod of malleable metal forming the shank with a transverse slot across the end thereof, inserting and holding a length of tungsten wire forming the tip in said slot, and swaging the end of said shank by endwise and lateral pressure to close the slot around said tip and permanently secure the tip to the shank.

In witness whereof, I have hereunto set my hand this 9th day of December, 1915.

WILLIAM W. MOYER.

STYLUS FOR SOUND REPRODUCING MACHINES.

1,251,908 ----- W. W. Moyer.
Patented Jan. 1, 1918.
Filed Jan. 15, 1916.

W. W. MOYER.
 STYLUS FOR SOUND REPRODUCING MACHINES.
 APPLICATION FILED JAN. 15, 1916.

1,251,908.

Patented Jan. 1, 1918.
 2 SHEETS—SHEET 1.

Fig. 2.



Fig. 1.

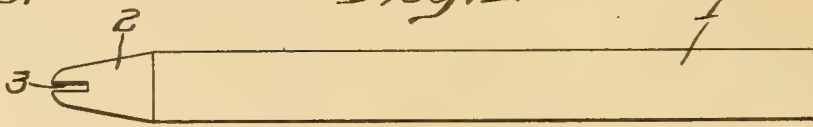


Fig. 4.



Fig. 3.

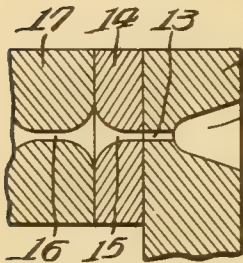
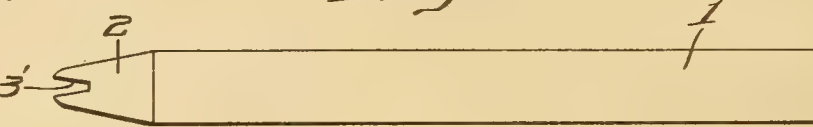


Fig. 5.

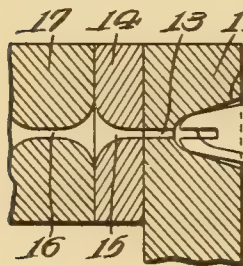
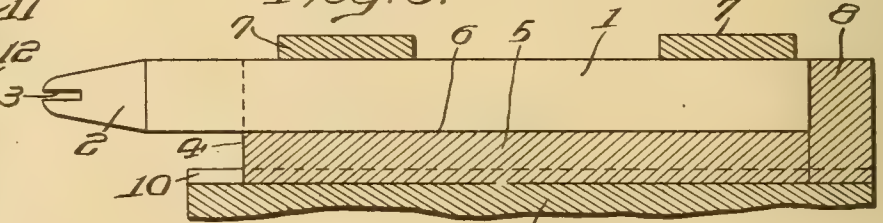


Fig. 6.

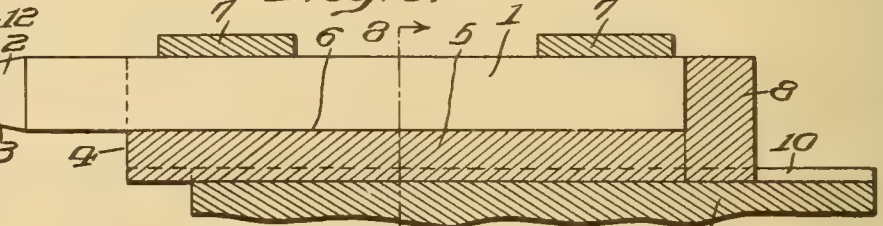


Fig. 7.

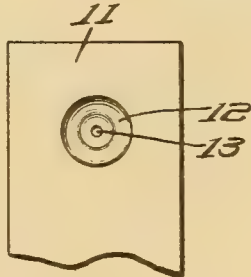


Fig. 8.

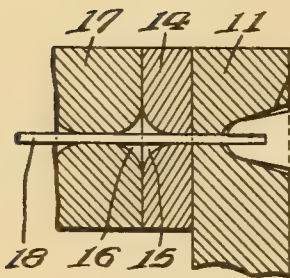
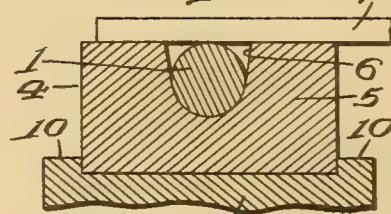


Fig. 9.

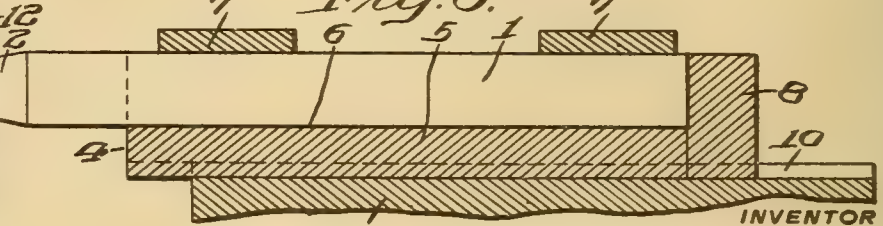


Fig. 10.



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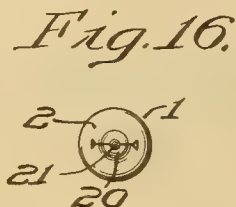
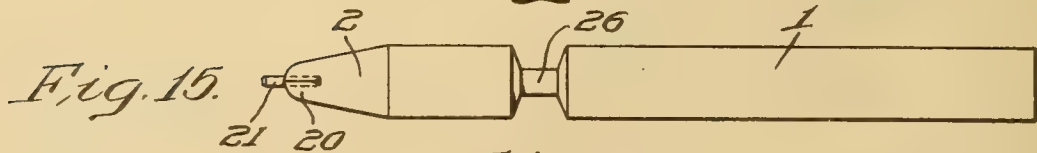
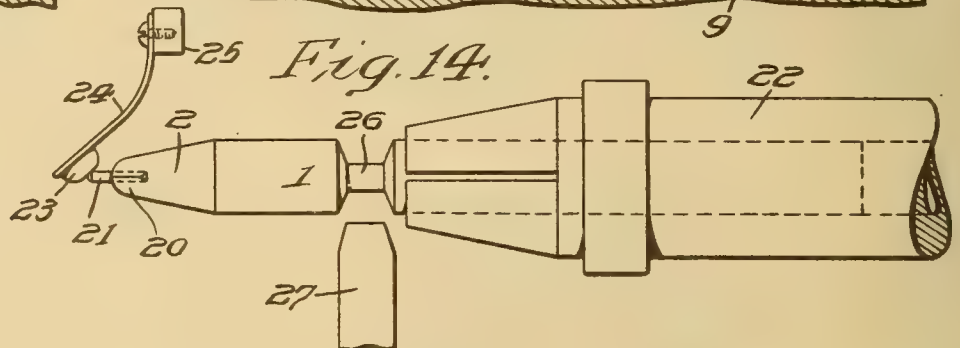
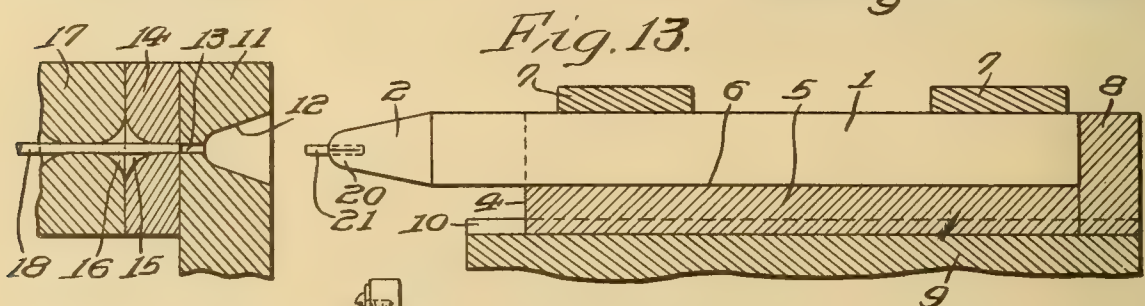
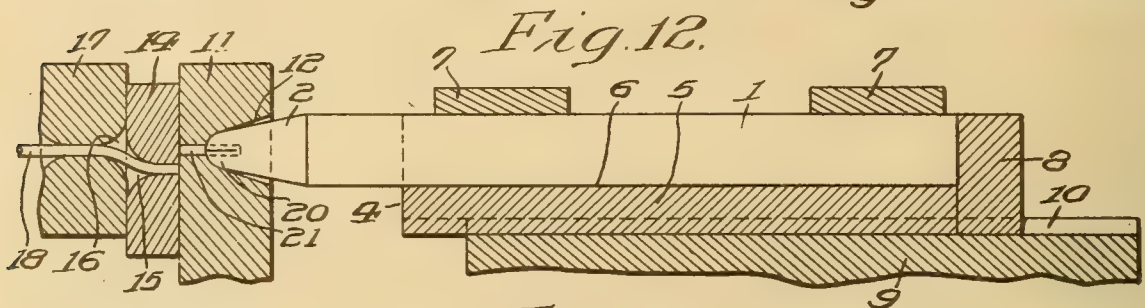
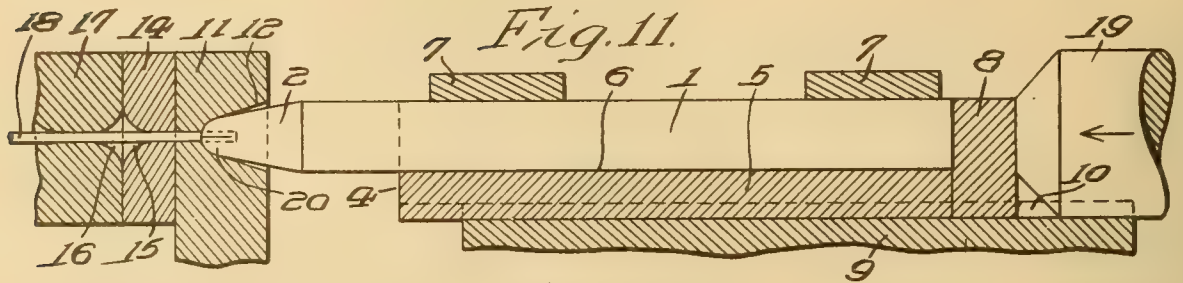
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W. W. MOYER.
 STYLUS FOR SOUND REPRODUCING MACHINES.
 APPLICATION FILED JAN. 15, 1916.

1,251,908.

Patented Jan. 1, 1918.
 2 SHEETS—SHEET 2.



WITNESS
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INVENTOR
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UNITED STATES PATENT OFFICE.

WILLIAM W. MOYER, OF CAMDEN, NEW JERSEY, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

STYLUS FOR SOUND-REPRODUCING MACHINES.

1,251,908.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed January 15, 1916. Serial No. 72,210.

To all whom it may concern:

Be it known that I, WILLIAM W. MOYER, a citizen of the United States, and a resident of Camden, county of Camden, and State of New Jersey, have invented certain new and useful Improvements in Styli for Sound-Reproducing Machines, of which the following is a specification.

It has been discovered that tungsten or tungstenic material is peculiarly adapted for styli or needles of sound reproducing machines. A stylus composed of tungsten or tungstenic material exhibits properties differing in a marked degree from those present in styli of other material. Among the characteristics are that a stylus of tungsten or tungstenic material has little injurious effect on the walls of the sound record groove during the reproduction of sound from a record and may be used a large number of times and on different records one after the other without injuriously affecting the walls of the sound record groove. It appears to rapidly wear at first until its sides in engagement with the sound record groove fit and conform to the shape of the groove, after which the wear is negligible or unappreciable throughout the reproduction of sound from the remainder of the groove of the record.

Tungsten is, however, a very difficult material to work, particularly when it is in the form of a wire, the diameter of which is substantially equal to the width of a sound record groove. Tungsten wire is brittle and tends to split. It is also expensive.

Since only a very small portion of a stylus is in actual contact with the walls of the sound record groove in reproducing sound from a record, it is obviously desirable to employ as little of it as possible. If, therefore, a steel shank be provided with a tip of tungsten or tungstenic material to engage and coöperate with the walls of the sound record groove, substantially all of the desirable properties of tungsten or tungstenic materials, as applied to this branch of this art, are utilized, and the present invention is a stylus having a shank of cheaper more easily wrought material, and a record engaging tip on the point or insert of tungstenic material, firmly and permanently united therewith or attached thereto. The object of my invention is to provide a stylus

for sound reproducing machines consisting of a tungsten tip or point of very fine tungsten wire of a diameter substantially equal to the width of a sound record groove, inserted into the end of a shank or stem of malleable metal, such as soft steel, the metal of said shank or stem around said tungsten tip or insert being swaged or forcibly compressed into permanent frictional holding engagement with said tungstenic insert.

The shank or body portion of the stylus may be swaged or compressed tightly around the tungsten tip or insert in any suitable manner, but in order that one way of making or constructing this stylus may be disclosed in this application, the steps of one process of making the same will be described below and is illustrated in the drawings forming a part of this application in which the same reference characters are used to designate the same parts throughout the various views.

Figure 1 is a side elevational view of a rod or wire of malleable metal, such as soft steel, tapered and slotted at one end, the same being of the size of an ordinary steel sound reproducing stylus. In actual practice, the shank or body portion is less than one-sixteenth of an inch in diameter, and is about three-fourths of an inch long. For the sake of clearness, the drawings are made on a greatly enlarged scale throughout the various views;

Fig. 2 is an end view of the shank or body portion illustrated in Fig. 1;

Fig. 3 is a side elevational view of a similar but modified form of shank, the slot in the free end thereof being slightly tapered or V-shaped;

Fig. 4 is an end elevational view of the shank shown in Fig. 3;

Fig. 5 shows the shank or body portion illustrated in Figs. 1 and 2 held in a suitable slidable carrier and positioned in alinement with a die of hard steel;

Fig. 6 shows the stylus body or shank together with its carrier, moved to bring the end of the stylus shank into engagement with the die;

Fig. 7 is a front view of the die showing the cupped recess therein and the small central aperture at the bottom thereof through which the tungsten wire is adapted to be threaded;

Fig. 8 is a cross-sectional view on the line 8—8 of Fig. 6 showing the carrier in which the body or shank of the stylus is positioned, held, and moved during the practice of the steps of this process of making the same;

Fig. 9 is a view similar to Fig. 6, but in which the tungsten wire has been inserted through the die and into the slot in the free end of the shank or body portion of the stylus;

Fig. 10 is an end view showing the shank in the position indicated in Fig. 9 with the tungsten wire in position;

Fig. 11 shows the swaging step in which a sharp blow or succession of blows or a high pressure of any kind is imparted to the rear end of the carrier to force the tapered end of the malleable steel wire into the bottom of the cup-shaped die, to swage the tapered end of the shank and to make it conform to the shape of the bottom of the die, to close the slot on the sides of the tungsten wire, and to force the metal on the end of the shank into gripping engagement with the tungsten wire insert;

Fig. 12 indicates the manner in which the tungsten wire is cut or severed at a short distance from the tapered end of the shank;

Fig. 13 shows the carrier moved back to substantially the position shown in Fig. 5 and the tungsten wire tip firmly united with the shank;

Fig. 14 indicates diagrammatically the grinding and rounding off, or beveling of the free end of the tungsten insert to remove any burrs or sharp edges which might be thereon and the simultaneous reducing of the diameter of a portion of the steel shank to make it more flexible at that point;

Fig. 15 is a side elevational view of the completed stylus; and

Fig. 16 is an end view of the same.

To make a stylus embodying the invention of this application, a piece of straight wire of substantially the length of an ordinary steel talking machine stylus or needle is tapered or beveled at one of its ends and is provided with a transverse slot at its tapered end to form a shank or body portion 1. This shank or body portion is preferably of a malleable wire, such as soft steel, is about one-sixteenth of an inch in diameter and is substantially three-fourths of an inch long. The shank, shown in Fig. 1, may be made on any suitable screw making machine. The shank or body portion is provided with a tapered end 2 and a transverse narrow slot or channel 3. The width of the slot or channel 3 is very small, as for example, slightly more than six one-thousandths of an inch wide; that is to say, slightly wider than the diameter of the wire that is to be inserted therein, as will be described below.

In Fig. 1, the opposite walls of the slot 3

are parallel and in the modification shown in Fig. 3, the sides slightly diverge, the bottom of the slot or channel being about six one-thousandths of an inch wide.

The shank or body portion 1 (as shown in Figs. 1 and 3) may be then placed in any suitable holder or carrier 4, preferably one which consists of an iron or steel block 5 having a groove or channel 6 in the top face thereof, the width of the said groove 6 being substantially the same as the diameter of the shank or body portion 1 and the bottom of the groove 6 being semi-circular and of a radius equal to the radius of the shank or body portion 1. In this way the under half of the shank or body portion 1 is made to snugly fit into the bottom of the channel or groove 6 throughout the length of the block 5 with its top surface substantially on a level with or a trifle above the top surface of the block 5. Suitable holding straps or fingers 7—7 may be arranged to slide over or clamp down upon the top of the block 5 to firmly hold or clamp the body portion or shank 1 seated in said groove. The said carrier 4 is preferably provided at its rear end with a hard steel anvil 8 made unitary with the block 4 in any suitable manner, and the shank or body portion 1 is held in the carrier with its rear end squarely seated against the block or anvil 8.

The carrier 4 is preferably relatively freely slidable on a basic support 9 between guides 10—10, arranged parallel to the axis of the groove 6 in the block 5. In alignment with the axis of the shank or body portion 1 when it is seated in the groove 6 as above described, is a die 11 of hard steel, the same having a cup-shaped recess 12 in that face nearest the end of the shank or body portion 1. At the bottom of the recess 12 in the die 11 is a small opening 13 in axial alinement with the cup-shaped recess 12. The said opening 13 is of a size to permit a fine tungsten wire of substantially the width of a sound record groove in a commercial sound record tablet to smoothly slide therethrough, the diameter of said wire being substantially five or six one-thousandths of an inch.

Against the rear face of the die 11, is any suitable cutting mechanism, such as a cutting blade 14 bearing tightly against the rear face of the die 11, provided with a passage 15 therethrough and movable transversely to the passage or opening 13 to bring the opening 15 therein into and out of alinement with the opening 13 in the said die 11. The said passage 15 at its end adjacent the die 11 is preferably of the same diameter as the opening 13 and its opposite end is considerably larger and preferably tapers rearwardly into registration with a similar but oppositely tapered opening or passage 16 in the rear block or tungsten wire guide 17.

Said die 11 is preferably rigidly mounted on any suitable rigid base or support. The cup-shaped recess 12 and the openings or passages 13, 15 and 16 are normally in axial

alinement with the axis of the shank or body portion 1 when the same is seated in the groove 6 of the block 5 as indicated in Figs. 5 and 6.

Having been positioned and held in the carrier 4 in the manner indicated in Fig. 5, the carrier or holder 4 is moved toward the die 11 to bring the tapered slotted end 2 of the shank or body portion 1 into contact with the interior of the cup-shaped recess 12 of the die 11 as shown in Fig. 6. The end of the shank 1 does not reach or engage the extreme bottom of the cup-shaped recess 12, but the edge of the smaller end of the tapered portion 2 rests against the walls of the recess 12.

A length of tungsten wire is then fed or advanced through the openings 16, 15 and 13 until its free end engages and seats on the bottom of the slot 3. The opening 13 and the width of the slot 3 are preferably slightly greater than the diameter of the tungsten wire 18. The wire just passes freely through the openings 16, 15 and 13. In Fig. 9, the tungsten wire 18 is shown as having been passed through the opening 16 of the tungsten wire guide 17 through the opening 15 in the cutting blade 14 and through the opening 13 in the die 11 and its free end is in engagement with the bottom of the slot 3 of the shank or body portion 1.

The tapered end 2 of the shank or body portion 1 is then swaged around the tungsten wire insert. This may be done by striking the anvil 8 a sharp blow with a hammer 19 of any suitable type actuated in any suitable manner by any suitable means. The tapered end 2 of the shank or body portion 1 of the stylus is thus driven into the bottom of the cup-shaped recess 12 in the die 11 and swages the tapered end 2 to the tungsten wire. The tapered end is caused to conform to the curved bottom of the recess 12. The slot 3 on each side of the tungsten wire 18 is closed and the metal of the tapered end is compressed tightly against the tungsten wire insert. In this manner the free end of the tungsten wire 18 is firmly and rigidly secured to and made substantially unitary with the tapered end 2 of the shank or body portion 1. When the blow is struck by the hammer 19 against the anvil 8 and is thereby imparted to the shank or body portion 1, the tungsten wire 18 is substantially free to slide or move with the shank 1, sliding slightly through the openings 13, 15 and 16. The tungsten wire is not held clamped in the die 11 nor in the cutting blade 14 nor in the tungsten wire guide 17. The tungsten wire is preferably held evenly pressed against the bottom of the channel 3

when the blow is imparted to the shank 1 by the hammer 19 so that it is not bent or broken by the advance of the stylus shank. As a matter of fact, the advance of the carrier or holder 4, in the shank or stylus 1, toward the die 11 as the result of the blow by the hammer 19 is very slight, but it is sufficient to shape the tapered end 2 of the shank or body portion 1 and make it conform to the shape of the bottom of the cup-shaped recess 12 and to close the slot 3 substantially completely around the tungsten wire 18 and to force the malleable metal of the tapered end 2 into very tight engagement with the tungsten wire insert 18.

The tapered end 2 of the shank or body portion of the stylus having thus been swaged around the free end of the tungsten wire, the cutting blade 14 may then be given a transverse motion to shear off the tungsten wire a short distance from the swaged and tapered end 20 of the shank or body portion 1. The distance from the bottom of the cup-shaped recess 12 to the rear face of the die 11 is made equal to the distance that the tungsten wire is to protrude from the end of the shank or body portion 1 in the finished stylus. To prevent the cutting of the tungsten wire between the cutting blade 14 and the tungsten wire guide or block 17, the passages 15 and 16 are tapered to a larger diameter than that of the wire in order to permit the wire to freely bend without breaking or severing as indicated clearly in Fig. 18.

After the blade 14 has severed the tungsten wire 18, the carrier or holder 4 is moved rearwardly away from the die 11, carrying with it the substantially completed stylus which now comprises a shank or body portion 1 having a tapered end 2, the outer extreme end 20 of which is tightly swaged around and firmly grips and holds a tungsten wire tip 21, the diameter of which tip is substantially equal to the width of the sound record groove. To round off the sharp edge of the free end of the tungsten wire tip 21 and to thereby remove any bur which might be on said end as a result of the shearing of the tungsten wire, the shank or body portion 1 of the stylus may be placed in any suitable rapidly rotating chuck 22 and the free end of the tungsten tip 21 projecting therefrom may be brought against any grinding or abrasive agent 23, such as a piece of Arkansas stone on the free end of a spring 24 secured to any suitable support 25. In this manner the end of the tungsten tip 21 may be beveled or rounded to approximate the shape of a sound record groove in transverse cross-section.

Simultaneously with or subsequent to the grinding and rounding of the tungsten tip 21, the shank or body portion of the stylus may be provided with a reduced portion 26

by turning down the shank to as small a diameter as may be desired with any suitable metal cutting tool 27.

For loud tone or full tone needles or styli, this step of providing the shank with a reduced portion 26 may be omitted.

When the end of the shank 1 is provided with the tapered slot or recess 3', the uniting of the shank and tungsten tip may be performed in the identical manner as that above described in connection with the shank shown in Fig. 1. The making tapered of the walls thereof so that at the outer end of the channel 3' the width is greater than the diameter of the tungsten wire, facilitates the threading of the wire into the channel 3', particularly if there be a slight bend in the tungsten wire which might otherwise cause it to strike against the small end of the conical portion rather than to enter the groove. The metal around the small end of the tapered portion 2 of the shank shown in Fig. 3 appears to more readily bend around the tungsten wire insert and conform to the interior of the die. It also appears to more completely, if possible, close the slot on each side of the tungsten wire insert.

A side elevational view of the finished stylus is shown in Fig. 15. An end view of the same is shown in Fig. 16. It is to be observed that the slot 3 of the original shank or body portion 1 has been tightly closed by the swaging process and that only a slight mark appears on the tapered surface of the shank or body portion at the bottom of what was the groove or channel 3 or 3'. All the metal of the swaged end is tightly closed around the tungsten wire and the tungsten wire is substantially unitarily united with the swaged end of the shank or body portion 1.

The stylus of this application, however, is not to be construed as being limited to any particular mechanism for performing the steps above set forth and the tapered end 2 of the shank 1 may be forced into the die in any suitable manner either by a single sharp blow or by a series of blows or by a slow substantially continuously high pressure provided the tapered end of the shank or body portion is thereby made to inclose the tungsten insert so firmly and tightly as to make the insert substantially unitary with the shank or body portion.

Instead of a parallel sided transverse slot or channel 3, or a tapered substantially V-shaped slot 3', the said end 2 may be provided with an axial hole of a diameter

slightly greater than the diameter of the tungsten wire and the tapered end 2 may be swaged around the tungsten wire insert in the same manner as has been above described, but this method of making the stylus of this application is not the preferred one, because of the difficulty of threading a tungsten wire into so small an opening in the end of the shank and because it is more difficult to swage the end of the stylus so made sufficiently to compress it into tight unitary engagement with the insert when the shank is provided with slots 3 or 3' first above described.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A stylus for sound reproducing machines comprising a tungsten wire tip and a shank of malleable metal swaged over and around said tip.

2. A stylus for sound reproducing machines comprising a shank of malleable metal and a tip of tungsten wire unitarily united to said shank by swaging.

3. A stylus for sound reproducing machines comprising a shank and a tip of tungsten wire projecting from the end of said shank, the metal of said shank around said tungsten wire being swaged into permanent frictional holding engagement with said wire.

4. A stylus for sound reproducing machines comprising a shank of malleable metal and an insert of tungsten wire projecting from the end of said shank, the metal of said shank surrounding said insert being forced into permanent frictional holding engagement with said insert.

5. A stylus for sound reproducing machines comprising a shank of malleable metal and a tungsten wire insert permanently secured to said shank by swaging, said tungsten wire being of a diameter not substantially greater than the width of a sound record groove in a commercial sound record tablet.

6. A stylus for sound reproducing machines comprising a shank and a tip of tungsten wire permanently secured to said shank by swaging, the diameter of said tungsten wire being not substantially more than six one-thousandths of an inch.

In witness whereof, I have hereunto set my hand this thirteenth day of January, 1916.

WILLIAM W. MOYER.

MACHINE FOR MAKING STYLI.

1,251,909 ----- W. W. Moyer,

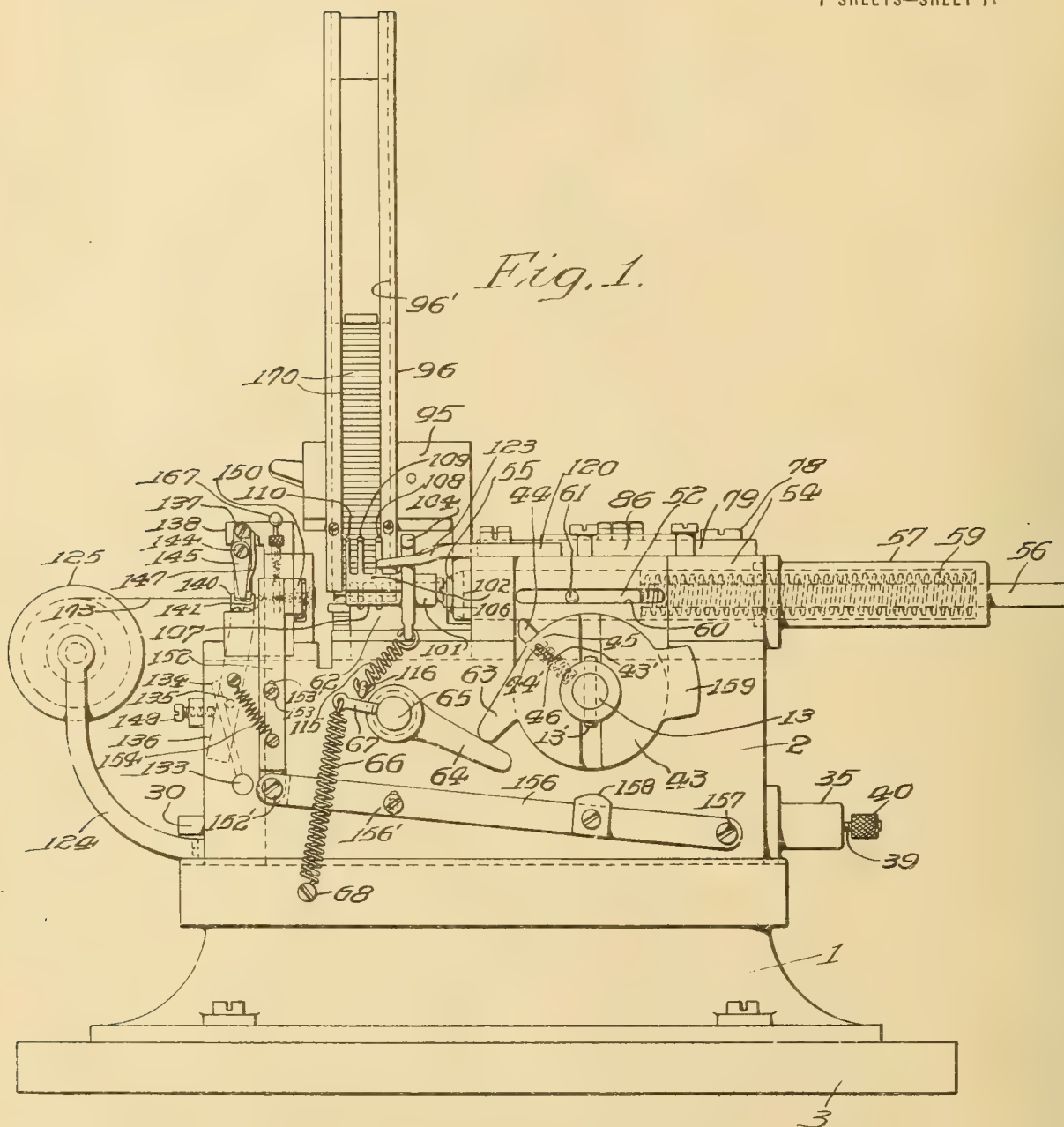
Patented Jan. 1, 1918,

Filed Apr. 28, 1916.

W. W. MOYER.
MACHINE FOR MAKING STYLI.
APPLICATION FILED APR. 28, 1916.

1,251,909.

Patented Jan. 1, 1918.
7 SHEETS—SHEET 1.



WITNESS

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BY

INVENTOR

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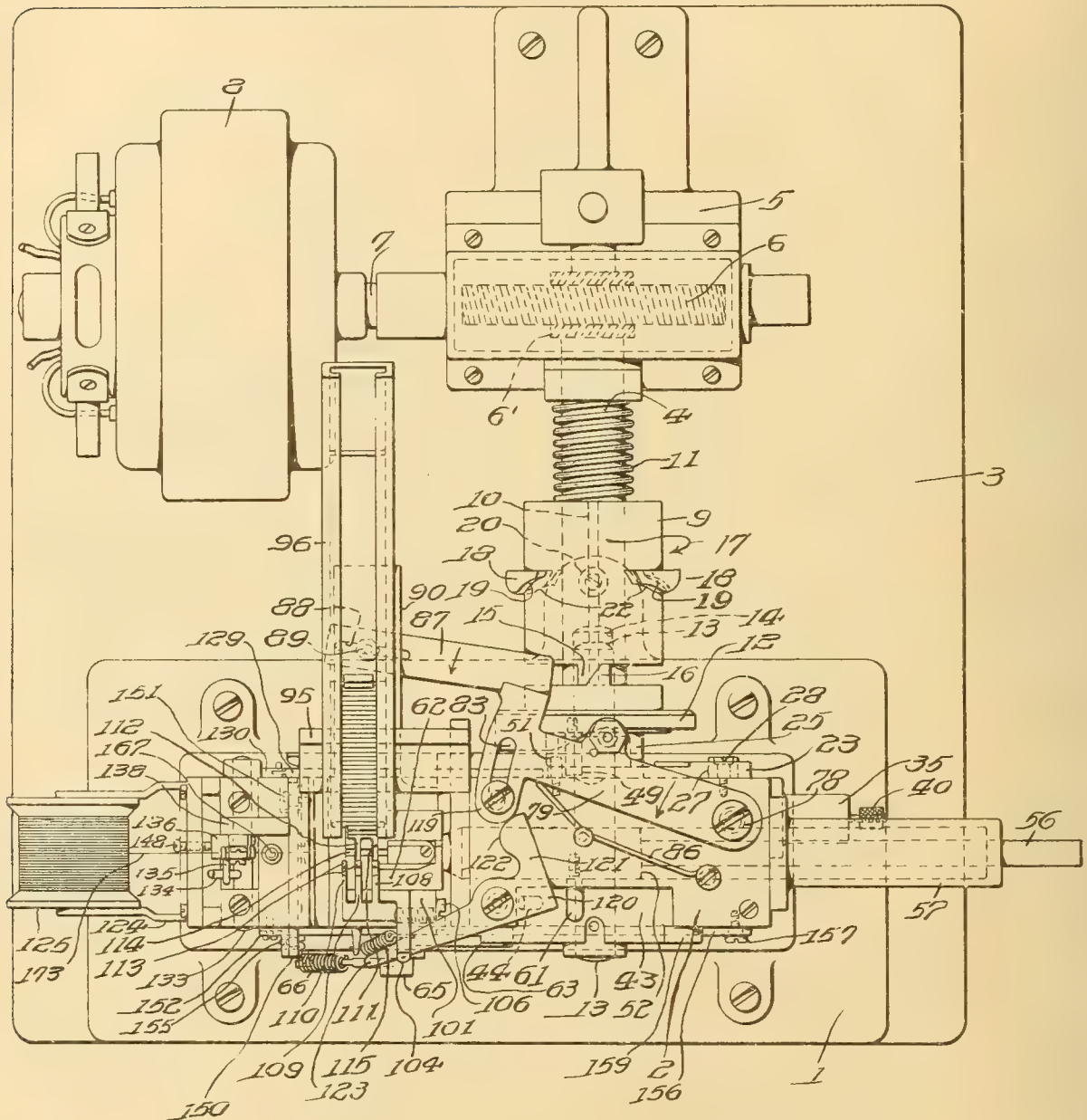
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ATTORNEYS

1,251,909.

Patented Jan. 1, 1918.
7 SHEETS—SHEET 2.

Fig. 2.



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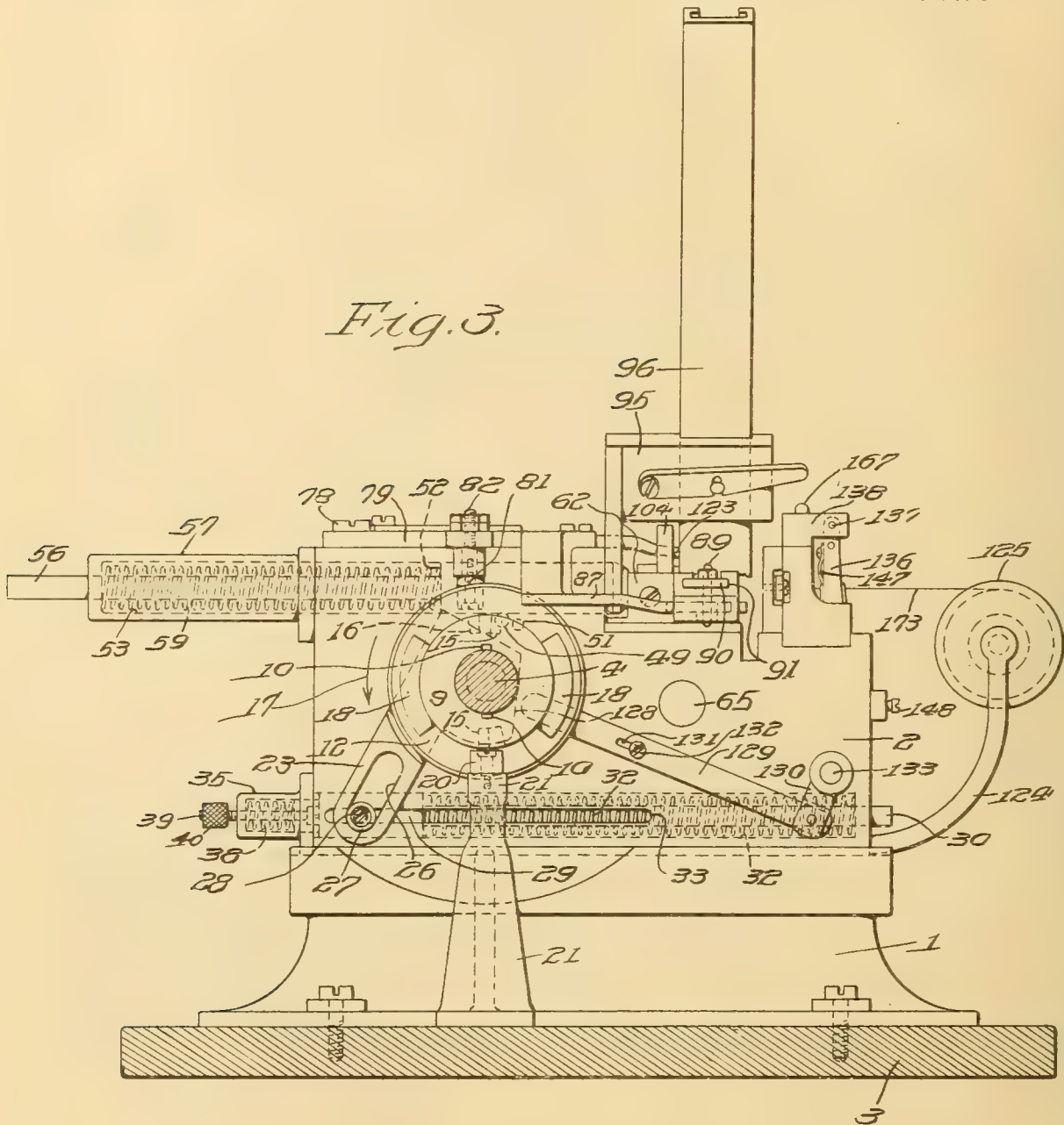
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W. W. MOYER.
MACHINE FOR MAKING STYLI.
APPLICATION FILED APR. 28, 1916.

1,251,909.

Patented Jan. 1, 1918.

7 SHEETS—SHEET 3.



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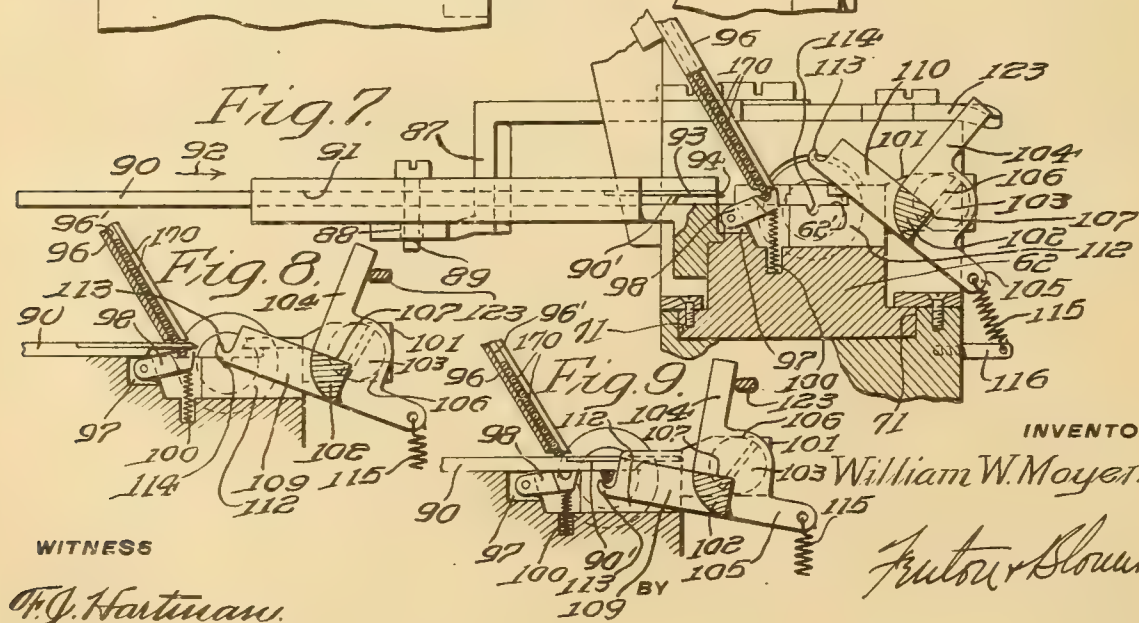
BY

Fulton & Blount,

ATTORNEYS

APPLICATION FILED APR. 28, 1916.

7 SHEETS—SHEET 4.



William W. Moyer.

Fulton & Blount.

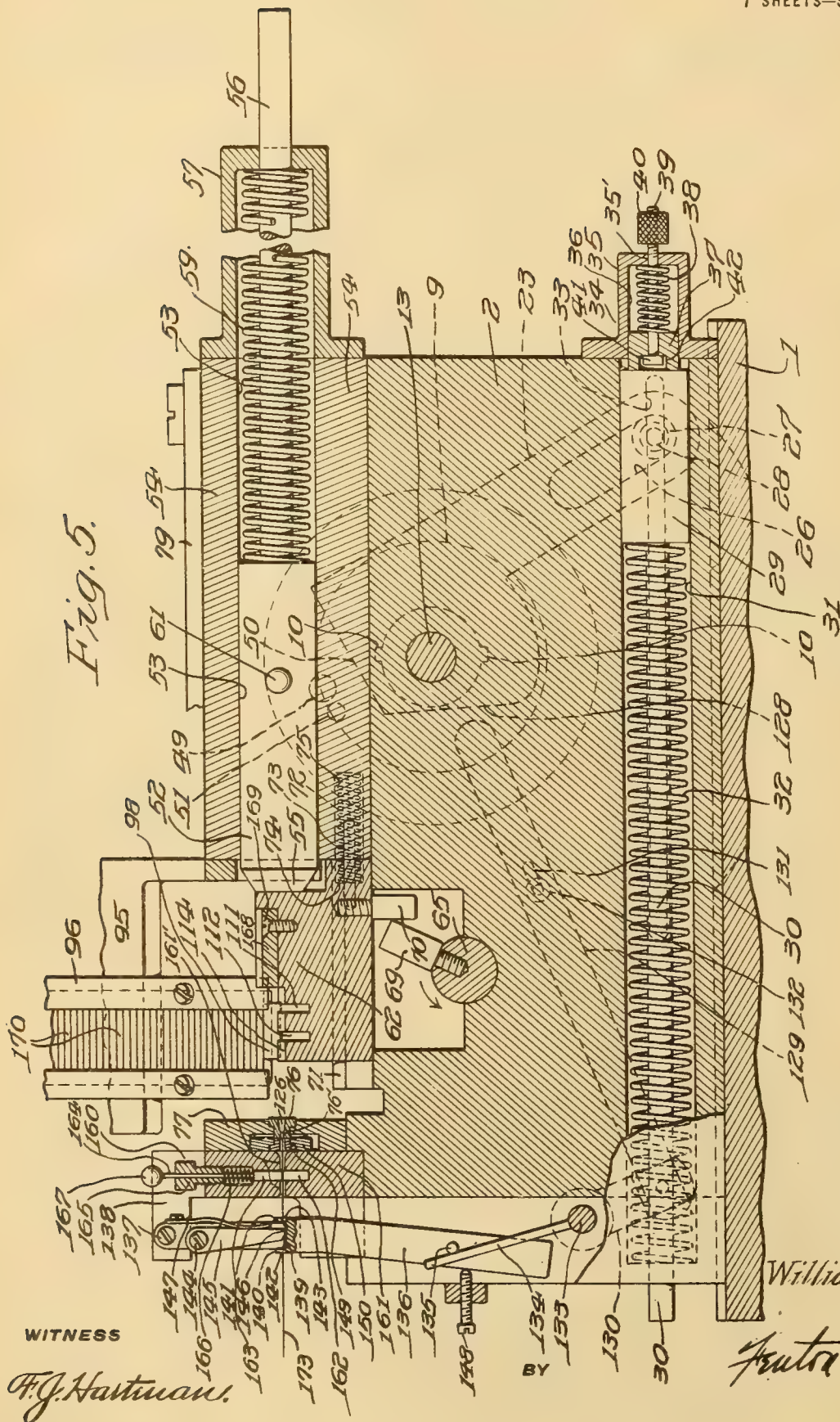
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F. J. Hartman.

1,251,909.

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7 SHEETS—SHEET 5.



W. W. MOYER.
MACHINE FOR MAKING STYLI.
APPLICATION FILED APR. 28, 1916.

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Patented Jan. 1, 1918.
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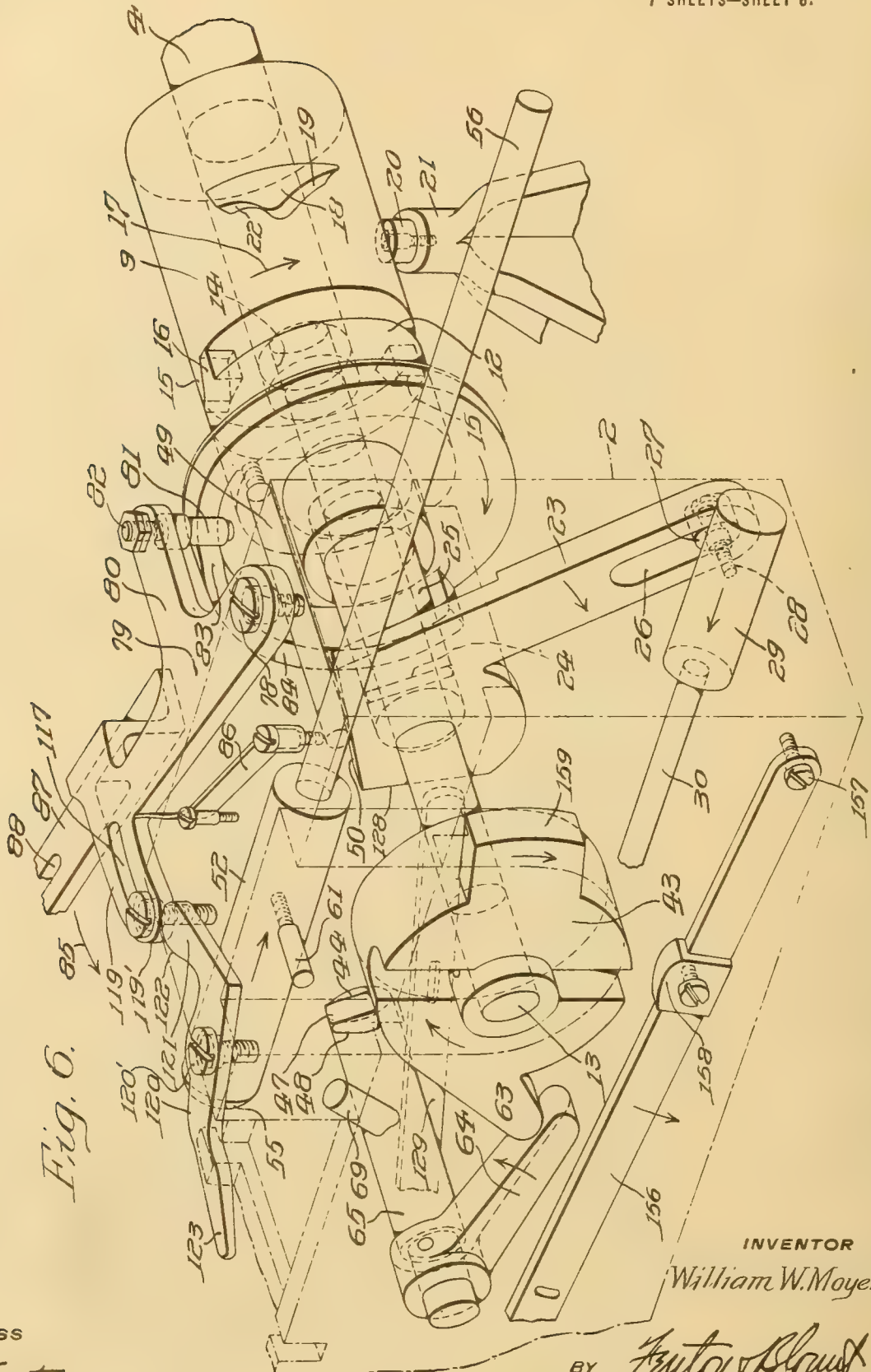


Fig. 6.

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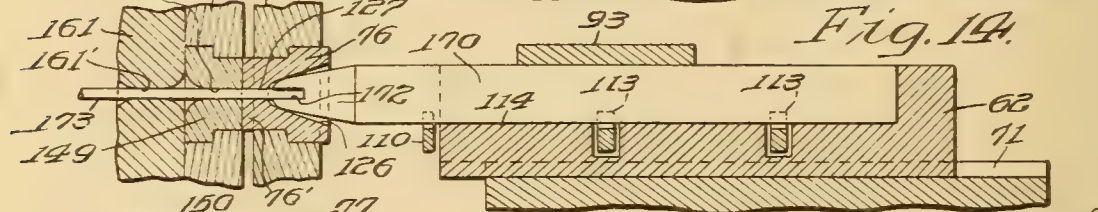
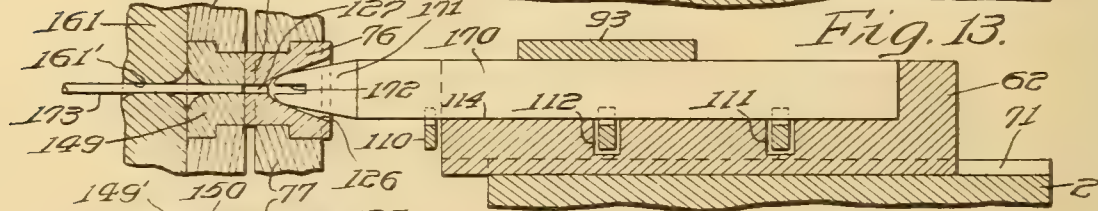
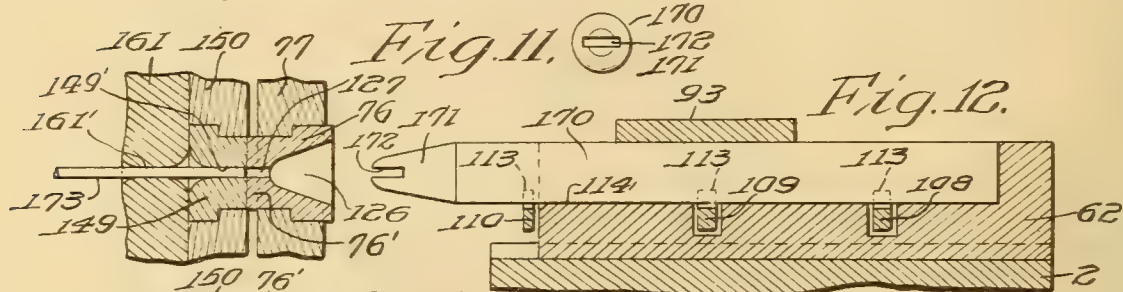
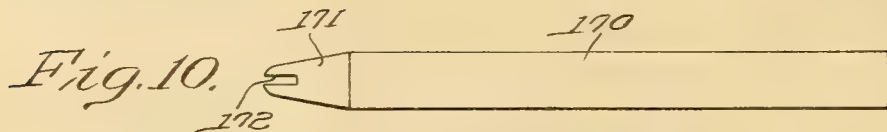
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W. W. MOYER.
MACHINE FOR MAKING STYLI.
APPLICATION FILED APR. 28, 1916.

1,251,909.

Patented Jan. 1, 1918.

7 SHEETS—SHEET 7.



UNITED STATES PATENT OFFICE.

WILLIAM W. MOYER, OF CAMDEN, NEW JERSEY, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

MACHINE FOR MAKING STYLI.

1,251,909.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed April 28, 1916. Serial No. 94,105.

To all whom it may concern:

Be it known that I, WILLIAM W. MOYER, a citizen of the United States, and a resident of Camden, in the county of Camden, State of New Jersey, have invented certain new and useful Improvements in Machines for Making Styli for Use in Connection with the Reproduction of Sound from Talking-Machine Records, of which the following is a full, clear, and exact disclosure.

My invention relates to machines for making styli for sound reproducing machines and particularly to machines in which the point or record-engaging tip or point of the stylus is composed of a different material from that of the shank or body portion of the stylus, the machine of this application being for the purpose of uniting a record-engaging tip or point to a shank or body portion of a stylus in such a manner that the shank and tip or point are so firmly united as to form a substantially unitary stylus having a shank or body portion of one material and an extremely small fine insert in the end thereof of a different material forming the record-engaging tip thereof.

It has been discovered that tungsten or tungstenic material possesses properties which make it peculiarly adapted for styli for reproducing sound from talking machine tablets. A stylus of tungsten or tungstenic material has little or no injurious effect upon the walls of a sound record groove of a sound record tablet in reproducing sound from such a tablet, and it may be used a large number of times on the same or on different records without injury to the walls of the sound record grooves. The record-engaging tip or point appears to wear rapidly at first until that portion thereof which is in actual engagement or contact with the sound record groove, conforms to the shape of and fits the groove, but after such shape of the tip of the stylus has been once attained, the wear of the said tip is thereafter negligible or inappreciable during the reproduction of sound from the remainder of the said groove, or so long as the shape conforms to the groove of a record with which it is being used or is to be used.

These properties then relate to a great extent to the effects produced by that portion of the stylus which is in actual engagement with the walls of the sound record groove. They relate to the record-engaging tip as

distinguished from the shank or body portion of the stylus, which does not come into actual contact with the walls of the sound record groove. Tungsten is an expensive material, and, therefore, if the record-engaging tip alone be formed of tungsten or tungstenic material, the properties above specified would characterize a stylus irrespective, generally speaking, of the material employed for the shank.

Tungsten is, however, a difficult metal to work, and it is not readily united or joined to other metals as for instance by welding, brazing or soldering, particularly when the tungsten is in the form of a wire of small diameter, as for instance, of a diameter substantially the same as or even smaller than the width of a sound record groove in a commercial sound record tablet.

One object of the present invention is to produce a stylus in which the record-engaging tip or point is of tungsten or tungstenic material, and the body portion of which is of a cheaper and more easily wrought material, such as steel.

Other objects of this invention are to unite a tungsten tip to a metal shank; to unite a tungsten tip to a shank of malleable metal by a swaging action; to swage the metal of a shank tightly around and into substantially unitary engagement with a tungsten wire insert, the diameter of the tungsten wire being of about the width of a sound record groove in a commercial sound record tablet, that is to say, of about five or six one thousandths of an inch in diameter.

Another object of this invention is to provide a machine which will swage a malleable metal shank into tight holding engagement with an insert of the tungsten wire.

A further object of my invention is to construct a machine by which fine tungsten wire is inserted into a recess provided in the end of a shank of steel or other malleable metal, and the metal of the shank is pressed, forced or swaged into unitary engagement with the tungsten wire thus inserted. Various forms of mechanisms might be provided for uniting the tungsten wire to the stylus shank but I have found that an efficient form of mechanism for accomplishing this result is one in which the tungsten wire and the material forming the stylus shank are brought together in a swaging die and a swaging blow delivered to the shank to force the material

of the shank into tight engagement with the tungsten wire. The objects of this invention are to provide a mechanism which will accomplish these operations in an efficient manner and it is apparent that other forms than the one specifically disclosed in the application could be readily made to effect the same result so long as the mechanism provides a means for feeding the tungsten wire through the die in pre-determined lengths, means to hold the shank material and provide a relative movement between the die and shank holder to bring the wire into a suitable recess in the end of the shank, and means to deliver a swaging blow to the shank to unite the two.

Other objects of my invention will appear in the specification and claims below.

Referring to the drawings forming a part of this application in which the same reference characters are used throughout the views to designate the various parts—

Figure 1 is a side elevational view of my improved machine for making styli of the character above described;

Fig. 2 is a plan view of the same;

Fig. 3 is a rear view of the same, the driving mechanism in the rear of the machine being removed;

Fig. 4 is an end view of the machine looking from the right hand side of Fig. 1, the same being on a larger scale than the scale of Figs. 1 to 3 inclusive;

Fig. 5 is a longitudinal section on an enlarged scale of the mechanism for operating the hammer and for inserting and cutting the fine tungsten wire;

Fig. 6 is a diagrammatic isometric view of the main parts of the mechanism showing generally the relations of the operative parts to each other and the manner in which the various mechanisms are all actuated from the main or driving shaft of the machine, the driving shaft and parts of the clutch mechanism being shown as of greater length measured rearwardly than they are shown in the other drawings for the purpose of clearness;

Fig. 7 is a fragmentary sectional view showing the mechanisms for feeding the needle shanks one at a time to the swaging mechanism and for ejecting the needle from the machine after the record engaging tip has been inserted in and secured to the shank;

Figs. 8 and 9 are similar fragmentary sectional views of the main parts of the mechanism illustrated in Fig. 7 showing the positions of the parts at different times during the operation of the device;

Fig. 10 is a side elevational view and Fig. 11, an end view of a stylus shank before it is provided with a record engaging tip;

Figs. 12 to 17 are views on a greatly enlarged scale and somewhat diagrammatic in

character, showing the relative movement of the stylus shank, the tungsten wire and principal parts of the machine during one cycle of the operation of the machine; and

Fig. 18 is a view of a modified and preferred form of stylus shank which may be readily provided with a record engaging tip in the machine of this application.

The operative mechanism illustrated is preferably mounted on a pedestal 1, to the top of which is secured in any suitable manner the main block or casing 2 upon and in which are mounted the various parts and mechanisms of the machine. The pedestal 1 may be supported on a suitable table 3. The machine is preferably driven by a driving shaft 4 (see Fig. 2) extending rearwardly of the machine and having its rear end mounted in a bearing block 5. Said shaft 4 is provided with a worm gear 6 which preferably meshes with a worm 6' on the motor shaft 7 of the driving motor 8. During the operation of the machine, the motor 8, its shaft 7 and the worm 6' thereon, the gear 6, and the main shaft 4 are continuously rotated.

Upon the main shaft 4 is mounted clutch member 9, said clutch member being prevented from rotating upon said shaft 4 by splines 10—10 extending longitudinally of the shaft. Between the clutch member 9 and the bearing block 5 and surrounding the shaft 4 is a coiled spring 11, the tension of which is to normally force the clutch member 9 away from the bearing block 5 and into engagement with the cooperating clutch member 12, mounted on and loose with respect to the shaft 13, which in turn is mounted in and passes through the main block or casing 2. The shaft 13 is coaxial with the shaft 4 and its rear end is fitted into a cylindrical hole 14 in the adjacent end of the main shaft 4, as clearly appears in Figs. 2, 4 and 6.

The clutch member 9 is provided with a pair of oppositely disposed lugs 15—15 to cooperate with a lug 16, on the adjacent face of the clutch member 12, the two clutch members being held normally together and in engagement by the coiled spring 11, as is clearly shown in Figs. 2 and 4. The faces of the lugs 15—15 which alternately engage the lug 16 and the coacting face of the lug 16 are inclined to each other, as is clearly shown in Fig. 2, to permit of their ready separation during the operation of the machine.

The motor 8 is driven so as to impart a rotary movement to the shaft 4 and the clutch member 9 in the direction of the arrow 17, (Figs. 2, 3 and 6), during the operation of the machine, that is to say, in clockwise direction to the operator standing in front of the machine.

The clutch member 9 is also provided upon

its exterior surface with a pair of oppositely disposed double-wedge-shaped cams 18—18, the low parts of the cam surfaces 19—19 of which lie in a plane tangent to the rear side of a roller 20 mounted on a suitable support or bracket 21 on the table 3 of the machine. As the shaft 4 is continuously rotated, the cam lugs 18—18 are successively brought into engagement with the roller 20, and, by reason of this engagement, the clutch member 9 is forced rearwardly against the action of the coiled spring 11, to intermittently withdraw the clutch member 9 from engagement with the clutch member 12 twice during every revolution of the shaft 4. The surfaces 22—22 of the cams 18—18 permit the clutch member 9 to gently move under the action of the coiled spring 11 back into engagement with the clutch member 12 as the cams 18—18 move out of engagement with the roller 20.

Upon the shaft 13 and bearing against the rear face of the block or main casing 2, is a lever 23 secured to the shaft 13 by a pin 24 passing through the hub 25 of the lever 23 and the shaft 13. (See Fig. 6). Said lever 23 is provided at its free end with a slot 26 extending substantially longitudinally thereof and within which is mounted a roller 27 smoothly fitting in the said slot 26, said roller 27 being mounted on a screw or stud 28 which in turn is secured to the head 29, secured to the rod 30 mounted in a suitable hole or opening 31 extending longitudinally of the main block or casing 2. Around the rod 30 and between the head 29 and the bottom of the hole or recess 31, is a coiled spring 32, the tension of which is to force the head 29 and the rod attached thereto to the right hand of the machine. (See Fig. 5.).

The main block or casing 2 is provided with a longitudinal slot 33 through which the screw or stud 27 extends. The head 29 is normally held by the spring 32 against a cushioning device or shock absorber 34 comprising the casing 35, having a cylindrical opening 36 therein within which is fitted a piston head 37. Between the piston head 37 and the bottom of the cylindrical opening 36 is provided a coiled spring 38, tending to force the piston head out of the said cylindrical opening, the device being provided with an adjusting screw 39 passing through the piston head 37 and through the casing 35 and within the coiled spring 38, the end of the adjusting screw outside of the casing 35 being provided with a nut 40. The purpose of the screw nut 40 is to prevent the piston head 37 from being forced out of the cylindrical opening 36 by the coiled spring 38 when the head 28 of the rod 30 is not in engagement therewith. One end of said adjusting screw 39 passes freely through an opening 35', in the casing 35 and the other

end is provided with a head 41 seated in a recess 42 in the face of the piston head 37. The casing 35 may be secured to the end of the main block or casing 2 in any suitable manner.

Secured to the front end of the shaft 13 by a pin 13' and bearing against the front face of the main block or casing 2 is a cam 43 projecting from the surface of which is a tooth 44. This tooth 44 is mounted in said cam 43 and extends radially therefrom. It is mounted in a recess 45 and is normally held projecting beyond the exterior surface of the cam 43 by a spring 46 within said recess 45 and tending to force said tooth 44 outwardly to a position in which the outer end of a transverse pin 44' in the tooth 44 bears against the outer end of a radial slot 43' in the body of the cam 43. The said tooth is provided with a radial flat face 47 and with an inclined face 48.

The clutch member 12 which, as above stated, is loose with respect to the shaft 13 and with respect to the hub 25, is provided with a pin or lug 49 extending toward the front of the machine and adapted, as the clutch member 12 is revolved to come into engagement with the surface 50 of the lever 23, the movement of said clutch member 12 in an anti-clockwise direction being limited by a stop pin 51 projecting rearwardly from the rear face of the main block or casing 2. (See Figs. 5 and 6).

Mounted longitudinally of the main block or casing 2 and above the rod 30 which for convenience will be termed the re-setting rod or plunger, is the hammer 52. This hammer is mounted in a cylindrical hole 53, extending longitudinally of the hammer casing 54 and consists of the hammer head 55 and the guide rod 56 extending rearwardly therefrom and freely through a cap 57 on the right hand end of the hammer casing 54. This cap is secured to the end of the casing 54 in any suitable manner as by screws 58. Within the hole or opening 53 and surrounding the guide rod 56 and pressing against the rear side of the hammer head 55 and the inner side of the cap 57 is a stiff coiled spring 59, the tension of which is to normally force the hammer head 55 in a direction away from the cap 57. Secured to the hammer head 55 and extending laterally outwardly through the hammer casing 54 of the hammer and through a longitudinal slot 60 in the casing 54, is a hardened steel pin 61 extending into the path of the spring pressed tooth 44. This hammer is actuated by the spring pressed tooth 44 and the coiled spring 59. As the shaft 13 turns clockwise the straight or radially flat face 47 of the tooth 44 comes into engagement with the hard steel pin 61 and moves the hammer from the position shown in Fig. 5 against the tension of the coiled spring 59 until the

outer edge or point of the tooth 44 passes beyond and out of engagement with the said steel pin 61. Immediately upon the release of the pin 61 from the tooth 44, the coiled
 5 spring 59 is free to act and impels the hammer head 55 forwardly away from the cap 57 and against the needle carrier 62, imparting a sharp heavy blow thereto. (See Figs. 1 and 5).

10 The mechanism for moving the needle carrier 62 will be next described, particular reference being had to Figs. 1, 5 and 6.

The cam 43 is provided with a projection 63 in engagement with which a lever 64, rigidly
 15 secured to a rock shaft 65, is normally held by a spring 66 having one end secured to a lever 67, also secured to the rock shaft 65, and its other end secured to a stud 68 in the top of the pedestal 1. This rock shaft
 20 65 is provided with a radially extending stud or arm 69 adapted to engage a depending stud 70 projecting from the bottom of the needle carrier 62. The needle carrier 62 is mounted to move in alinement with the
 25 hammer head 55 in guide-ways 71—71. (See Figs. 5 and 7.) Between the hammer casing 54 and the needle carrier 62 are one or more similarly arranged and similarly acting coiled springs, one of said springs 72 being
 30 shown in Fig. 5. Said coiled spring 72 is mounted on and surrounds a stud or pin 73 in an opening 74 in the needle carrier 62 and extends into an alined opening 75 in the hammer casing 54. This spring 72 is a compression spring and its tension is such as to
 35 tend to force the needle carrier 62 away from the end of the hammer casing 54. If more than one spring is used, their mountings and functions will be like those of spring 72. Now, as the shaft 13 begins to
 40 revolve clockwise due to the engagement of the clutch members 9 and 12, and the engagement of the pin 49 with the surface 50, the cam 43 on the shaft 13 also turns in a
 45 clockwise direction and the lever 64, held in engagement with the finger or projection 63 of the cam 43 follows the projection 63 by reason of the tension of the coiled spring 66, and the rock shaft 65, moves in an anti-clock-
 50 wise direction, thus allowing the coiled spring 72 to move the needle carrier 62 in the guide-ways 71—71 away from the hammer casing 54, until the end of the needle shank carried thereby comes into engage-
 55 ment with the cup-shaped die 76, rigidly mounted in the anvil 77, as will be later referred to.

When, however, the clutch members 9 and 12 have been withdrawn from engagement
 60 with each other, and the cam 43 returns to its normal position shown in Fig. 1, the projection 63 will reengage the lever 64 and will move the rock shaft 65 in the reverse or clockwise direction compressing the spring
 65 72 and moving the needle carrier 62 back

into engagement with the end of the hammer casing 54.

Pivoted on a stud or pin 78 on the top of the hammer casing 54 is a lever 79 having a projection 80 depending from which is a
 70 roller 81 mounted on a stud 82 secured to said projection 80. Said roller 81 extends downwardly and into the path of a cam 83 mounted on and rigidly secured to the loose clutch member 12. Said cam 83 has a
 75 cam surface 84 so arranged that as the cam 83 turns in a clockwise direction it swings the lever 79 in the direction of the arrow 85. (See Fig. 6.) When the cam 83 is oscillated with the shaft 13 in the reverse or
 80 anti-clockwise direction, the leaf spring 86 holding the roller 81 against the cam surface 84, moves the lever 79 in the reverse direction. Thus, after every oscillation of the shaft 13, the lever 79 is given an oscillatory
 85 movement. The lever 79 is provided with an arm 87 provided with a longitudinal slot 88 into which projects and is fitted a pin or stud 89, (see Figs. 2, 3, 4, 6 and 7), said
 90 stud being rigidly secured to a pusher rod 90 mounted to oscillate longitudinally in guide-ways 91 as the arm 87 of the lever 79 is oscillated in the manner above described. This
 oscillation of the lever 79 thus imparts a longitudinally reciprocatory motion to the
 95 pusher rod or slide 90.

Referring now to Figs. 7, 8 and 9, the inner end of the pusher rod or slide 90 is provided with a thin resilient plate 93, having
 a sharp edge 94 projecting beyond the end
 100 of the pusher rod 90. Secured to the back of the hammer casing 54 is a bracket 95 upon which is mounted a needle magazine 96, provided with a slot 96' adapted to contain a plurality of shanks or body portions of the
 105 needles or styli. In this magazine 96, the needle shanks are arranged parallel to the axis of the hammer and one above the other. The lower needle or needle shank in the magazine is in a position slightly above the
 110 horizontal plane passing through the axis of the hammer. Pivoted to the needle carrier 62 in a slot or recess 97 is a lever 98, the free end of which is provided with a groove 99 in which the lowermost needle is supported.
 115 The free end of the lever 98 is pressed against the bottom of the needle magazine 97 by a coiled spring 100.

The needle carrier 62 is also provided with a lug 101 upon which is pivotally
 120 mounted a needle ejector 102, the same consisting of a bell crank lever 103 provided with an operating arm 104 and a spring attaching arm 105, the bell crank lever 103 being secured to the lug 101 by a stud or
 125 screw 106. Said bell crank lever 103 is provided on its face with a projection 107 extending parallel to the axis of the hammer head 55 and from which laterally project three needle ejecting fingers, 108, 109 and
 130

110, of which the fingers 108 and 109 are adapted to be swung into slots 111, 112 respectively in the needle carrier to a position whereby the hooked ends 113 of the
 5 fingers 108, 109 and 110 lie below a horizontal plane passing through the center of the hammer.

The needle carrier 62 is provided with a flat upper surface 62' and with a groove 114, the bottom of which is semi-circular and the
 10 center of curvature of which is in alinement with the axis of the hammer head 55, said groove being of the depth equal to the diameter of the shank of the stylus.

15 A spring 115 has one end attached to the free end of the spring attaching arm 105 of the bell crank lever 103 and its other end attached to a stud or pin 116, the tension of which is such as to normally hold the needle
 20 ejecting fingers in an elevated position, such as is shown in Fig. 7.

The lever 79 is preferably provided with a slot 117 through which passes a stop pin or screw 118, the slot being concentric with the
 25 stud or pin 78 upon which the lever 79 is pivoted and the said slot 117 freely positioned in a laterally projecting arm 119 of said lever 79, the surface 119' of the end of said arm 119 being preferably substantially
 30 semicircular. Upon the upper surface of hammer casing 54 is the lever 120 for communicating motion from the lever 79 to the needle ejecting fingers. This lever 120 is substantially a bell crank lever having the
 35 arm 121 provided with a curved surface 122, normally pressing against the surface 119' of the laterally projecting arm 119 of the lever 79 and having its other arm 123 projecting outwardly and under the lever en-
 40 gaging arm 104. The spring 115 exerts sufficient tension to draw or lift the needle ejecting fingers 108 to 110 upwardly with considerable force and to hold the surface 122 of the arm 121 in engagement with the sur-
 45 face 119' of the projecting arm 119 of the lever 79.

Mounted upon the end of the main block or casing 1 is a bracket 124, the upper end of which is provided with a reel 125, adapted
 50 to contain a coil of fine tungsten wire 173 which wire passes through a wire feeding mechanism, a tension device 160, a wire cutter 149 and into a swaging die 76. The die 76 is of hard steel and has a cup-shaped
 55 opening 126 in the face thereof adjacent the hammer head 55 and the bottom of said die is provided with a minute axial opening 127, slightly larger than the diameter of the tungsten wire 173 to be fed therethrough.
 60 Said die 76 is preferably threaded into a heavy block of steel forming the anvil 77, rigidly secured to the main block or casing 2 in any suitable manner.

For feeding or advancing the tungsten
 65 wire into and through the cup-shaped die

76, the lever 23 is provided with a cam shoulder 128 adapted as the lever 23 is moved clockwise to come into engagement with the free end of a slidable rod or bar
 129 having one end attached to a short 70 crank 130 and being provided with a slot 131 through which passes a stud or pin 132 by means of which rod 129 is free to slide on the back surface of the main block or casing 1. The crank 130 is rigidly secured 75 to a rock shaft 133 (see Figs. 3 and 5), said rock shaft 133 being provided with an upwardly extending arm 134 which is in engagement with a pin 135 in a depending lever 136 pivoted at its upper end by a pin 80 or stud 137 to a bracket 138, secured to the main block or casing 2. The depending lever 136 is provided with a substantially flat wire gripping surface 139 and with lugs 140 and 141 on each side thereof, said lugs 85 being provided with small alined openings 142 and 143 respectively therethrough, of a diameter slightly greater than the diameter of the wire to be fed and said openings being slightly spaced above said wire gripping 90 surface 139. Pivoted near the top of said lever 136 on a pin or stud 144, is a wire gripping lever 145 having a sharp edge 146 normally pressed into engagement with said gripping surface 139 by a leaf spring 147. 95 An adjusting screw 148 is provided on said main block or casing 2 for regulating the amount of motion to be imparted to the lever 136 by the upwardly extending arm 134.

The rear portion 76' of the cup-shaped die 100 76 forms one of a pair of shearing members for severing, from time to time, predetermined lengths of wire fed into the machine. The other shearing member consists of a hardened die 149, having a smooth face 105 slidable over the smooth rear face of the cup-shaped die 76. Said hardened die 149 is preferably rigidly mounted in a lever 150 pivoted at one end on a stud 151 (see Fig. 2) and having its forward end connected to 110 a bar 152, slidable substantially vertically on the face of the main block or casing 2 on a stud 153 passing through a slot 153' in said bar 152. A spring 154 is attached to the connecting bar 152 and tends to draw up- 115 wardly on said bar 152 and lever 156 attached thereto and tends to normally hold the openings 149' in the shearing die 149 and the opening 127 in the die 76 in axial alinement. The upper end of said bar 152 120 and the front end of said lever 150 are pivotally connected together by a bolt or pin 155 (see Fig. 2). The lower end of said sliding bar 152 is pivotally connected by a pin 152' to the free end of a lever 156 piv- 125 oted on a stud or pin 157 to the front face of the main block or casing 2. Said lever 156 carries a block 158 arranged in the path of a projection 159 on the cam 43, said projec- 130 tion 159 engaging said block 158 at or near

the end of the movement of said cam 43 in its clockwise oscillation. The lever 156 may be provided with a pin and slot connection 156' to steady the lever 156 in its movement and to limit the movement of the lever 156 in an upward direction when it is out of engagement with the projection 159.

Between the lever 150 and the feeding lever 136 is a tensioning device 160 comprising a block 161, having openings 161' there-through in alinement with the opening 127 in the cup-shaped die 76, and a pin 162 of hard steel seated in said block 161. The upper surface of said pin 162 is substantially flat and is substantially tangential to the openings 161'—161' through said block 161. Above the pin 162 is a plunger 163 having a slightly convex surface in engagement with the pin 160 and provided with an outwardly extending stem 164 passing through an adjustable bushing 165. Between the plunger 163 and the inner end of the bushing 165 is a coiled spring 166, the tension of which is to force the plunger 163 into engagement with the top surface of the pin 162 of hard steel. The bushing 165 is preferably threaded into the block 161 so as to impart to the plunger any desired amount of pressure. The upper end of the plunger 163 is preferably provided with a knob or handle 167 whereby the plunger 163 may be manually lifted from out of its engagement with the pin 162. The wire 173 may be subjected to the degree of tension desired by passing the said wire between the plunger 163 and the pin 162, and this tensioning device prevents the movement of the tungsten wire 173 rearwardly out of opening 127 in the die 76 as the depending feeding lever 136 moves rearwardly to grip a new length of tungsten wire to be next fed through the shears and into the die 76.

At the rear of the groove 114 in the flat upper surface 62' of the needle carrier 62 is provided a plate or block 168 secured to the needle carrier 62 by a screw 169 to assist in guiding the needles fed thereto from the needle magazine 96 by the pusher rod 90.

The needle magazine, or more strictly the magazine in which the shank or body portion of the styli is placed and from which they are fed, one at a time, into the machine and are therein provided with tips or record-engaging points, is preferably separably mounted on the bracket 95 so that as fast as one magazine is emptied it may be replaced with another magazine filled with stylus bodies. To readily accomplish this, the bracket 95 is provided with a rectangular slot 175 (see Fig. 3) forming a seat into which the rectangular back of the needle magazine 96 fits. The magazine 96 is provided on its back with a headed stud 176 passing through a suitable opening in the bracket 95. On the back of the bracket 95

is a locking lever 177 pivoted on a pivot pin 178 and provided on its lower edge with a slot 179 fitting the sides of the stud 176. The magazine 96 may be removed from the bracket 95 by swinging the lever 177 upwardly clear of the head of the stud 176, and lifting the magazine out from the rectangular seat or slot 175. A new magazine may be used to replace the removed one by placing it in the seat 175, with the stud passing through the said opening in the bracket 95 and swinging the lever 177 downwardly. A weight 180 may be placed in the slot 96' of the needle magazine resting on top of the uppermost needle therein, to insure the downward feed of the needles or shanks in the slot 96'.

Before describing the operation of the machine, an understanding of the various steps of the process as carried out by the mechanism above described will be helpful and these steps are illustrated in a somewhat diagrammatic manner in Figs. 10 to 18 of the drawings.

The shank 170 of the stylus which is to be provided with a tungsten tip is illustrated in Figs. 10 and 11 and its tapered end 171 is preferably provided with a transverse slot 172. This shank, 170, is inserted by the needle feeding mechanism into the slot or groove 114 of the needle carrier 62 while the needle carrier 62 is stationary. The needle carrier 62 is then given a motion to the left to bring the tapered end 71 thereof into engagement with the interior surface of the cup 126 of the cup-shaped die 76, the fine tungsten wire 173 being then positioned in the minute axial opening 127 in the bottom of the cup-shaped die 76, passing from the reel 125 through the tensioning device 160 and through the cutting die 149 to the bottom of the cup-shaped opening 126 in the die 76. The device for feeding the wire 173 is then actuated to advance the tungsten wire into and to the bottom of the transverse slot 172 of the shank 170. A sharp blow is then imparted to the needle carrier 62 by the hammer head 55 with the result that the metal of the tapered end 171 of the shank 170 is swaged around the tungsten wire which was inserted therein. This swaging action causes the metal to tightly inclose the tungsten wire insert, operates to close the slot 172 on each side of the tungsten wire insert, and to so shape the tapered end 171 of the shank 170 as to make it substantially conform to the shape of the cup-shaped opening 126 in the die 76. The next step consists in operating the shears to sever the tungsten wire 173 at a short distance from the end of the shank 170 as illustrated in Fig. 17. After this has been done, the cutters return to their normal position with their openings in alinement with the opening 127 of the die 76 and the needle carrier

62 is moved rearwardly away from the die 76. At this point, the ejector mechanism is operated to suddenly move levers 108—109 and 110 upwardly to throw the shank 170, now provided with a tungsten wire tip, 174, (shown in Fig. 17) out of the needle carrier 62 into a suitable receptacle, whereupon the cycle of operations above described are repeated.

10 With this brief outline of the operations performed by the machine, the subject-matter of this application, a description of the operation of the sub-mechanisms thereof, will now be set forth, so far as is possible in the order in which they are actuated.

15 In all the figures, excepting Figs. 8 to 18 inclusive, the mechanism is shown at the beginning of the cycle of operations performed by it, the clutch member 9 having been thrown into engagement with the clutch member 12 and one lug 15 being just brought into engagement with the lug 16. The main shaft 4 and the parts connected thereto and operated thereby, turn in a clockwise direction, when viewed from the front of the machine. As the clutch member 12 now begins to turn with the shaft 4 through the clutch member 9, the cam 83, unitary with the clutch member 12, comes into almost immediate engagement with the roller 81 depending from the lever 79 and swings the lever 79 in the direction of the arrow 85. This motion of the lever 79 performs two functions, (1) it actuates the 25 needle feeding mechanism and (2) it sets the needle ejecting mechanism. The operation of the needle feeding mechanism will first be described.

40 As the lever 79 swings in the direction of the arrow 85, the arm 87 carrying the stud or pin 88 slides the pusher rod 90 in the direction of the arrow 92. (See Fig. 7). This motion of the pusher rod 90 first brings the sharp edge 94 between the lowermost needle 45 and the needle immediately above it in the needle magazine 96, the top surface of the plate 93 operating to prevent the needles above it from falling down and out of the magazine 96. This forward movement of the plate 93 holds the lowermost needle in the slot 97 of the lever 98 and as the forward beveled edge 90' of the pusher rod 90 engages the top surface of the spring pressed lever 98, it first depresses it against the action of the coiled spring 100 and when the 55 edge 90' engages the lowermost needle it pushes it forwardly out of the groove 99, out of the lever 98 and over the top flat surface 62' of the needle carrier 62 until the 60 needle reaches the groove 114 in the top surface of the needle carrier 62 into which groove it drops. The groove 114 is of a depth equal to the diameter of the needle or needle shank and the pusher rod, continuing 65 its movement in the direction of the arrow

92, firmly holds the shank or needle 170 in the groove 114 by the engagement of under surface of the pusher rod 90 with the top of the needle, now in the groove 114. This action of the pusher rod is clearly illustrated 70 in Figs. 7, 8 and 9.

The other mechanism operated by the lever 79 is the needle ejecting mechanism, the operation of which will now be described. Referring first to Figs. 2 and 6 as the lever 75 79 swings in the direction of the arrow 85, the projecting arm 119 moves the intermediate lever 120, by virtue of the engagement of the surface 119' of the arm 119 with the curved surface 122 of the arm 121 of the 80 bell crank lever 120, turning it upon its stud or pivot 120' and moving the other arm 123 of the bell crank lever 120 inwardly or away from the front of the machine. This arm 123 is in engagement with the operating arm 85 104 of the bell crank lever 103 of the needle ejecting mechanism, said arm, 104, being spring pressed against the arm 123 by the spring 115. This motion swings the bell crank lever 103 and the needle ejecting fin- 90 gers 108, 109, 110 carried thereby in an anticlockwise direction (when viewed in the position shown in Figs. 7, 8 and 9) until the needle ejecting fingers 108 and 109 come to rest in the slots 111 and 112 respectively in 95 the top of the needle carrier 62, with the hooked ends 113 thereof below the groove 114 in the needle carrier 62. When the lever 79 has reached the full limit of its swing in the direction of the arrow 85 (Fig. 6) that 100 is to say, when the cam surface 84 of the cam 83 has moved the roller 81, the full extent of the throw of said cam, the pusher rod 90 and the needle ejecting fingers 108, 109 and 110 are in the position shown in Fig. 105 9, the simultaneous movement of these two mechanisms being shown in Figs. 7, 8 and 9 of the drawings.

To effect this motion of the lever 78, the clutch member 12 and the cam 84 carried 110 thereby, are turning loosely on the shaft 13 and the hub 25 of the resetting lever 23, without effecting any rotation of the shaft 13 or of resetting lever 23; and this movement of the clutch member 12 finally brings 115 the pin 49 carried by the cam 83 into engagement with the surface 50 of the resetting lever 23. (See Fig. 5.) Immediately upon the engagement of the said pin 49 with the said flat surface 50, the resetting 120 lever 23 begins to move in a clockwise direction with the driving shaft 4. The resetting lever 23 is pinned to the shaft 13 and causes the shaft 13 to rotate together with the parts carried thereby. This movement of the re- 125 setting lever 23 immediately moves the resetting rod 30 longitudinally against the action of the spring 32 bearing against the head 29 of the resetting rod and the coiled spring 32 is compressed as long as the re- 130

setting lever 23 continues to move with the main or driving shaft 4, and this movement continues until one of the cam lugs 18 of the clutch member 9 comes into engagement 5 with the roller 20, and thereby withdraws the clutch member 9 from the coöperating clutch member 12. Immediately upon the complete separation of the clutch members 9 and 12, the resetting spring is free to act 10 and forces the resetting rod 38 back to the position shown in Fig. 5. The resetting lever 23 is thus set back to the position shown in Fig. 5. This rapid return movement of the lever 23, under the influence of the 15 spring 30, throws the clutch member 12 and the cam 83 carried thereby in an anticlockwise direction throwing the pin 49 back against the stop pin 51 projecting from the rear surface of the main casing 2. In this 20 way the lever 23 is swung in one direction by the main shaft 4 until the clutch members 9 and 12 have been separated, whereupon the resetting spring 32 returns the lever 23 to its normal position shown in Fig. 5 and throws the cam 83 back to its normal 25 position with the pin 49 adjacent the stop pin 51. This is the mechanism for imparting an oscillatory motion to the shaft 13 and it is during this oscillatory motion that 30 the other mechanisms are operated. The spring 32 is a strong one and the head 29 of the resetting rod 30 strikes a hard blow upon the piston head 37 of the cushioning device 34. The function of the cushioning 35 device 34 is to reduce the shock and noise that would result, without it, from the force of the blow of the resetting rod on its return to its normal position.

As the cam 43 on the front of the machine, and keyed to the shaft 13, moves with 40 said shafting in a clockwise direction, (and it is to be noted that the cam 13 does not begin to turn until the cam 83 has imparted its full throw to the lever 79), it turns in a clockwise direction, when viewed from the 45 front of the machine, and carries the projection 63 upwardly. The lever 64 follows the projection 63 upwardly, being held in engagement therewith by the spring 66, and 50 the rock shaft 65 is thus turned by the spring 66. In other words, the movement of the projection 63 permits the spring 66 to move the rock shaft 65 in an anticlockwise direction, when viewed from the front 55 of the machine. (See Fig. 1.) Referring now to Fig. 5, it will be seen that as the rock shaft 65 turns under the influence of the spring 66, the radial stud 69 moves to the left, but the depending stud 70 of the needle 60 carrier 62, pressed against the stud 69 by the spring 72, follows the radial stud 69 during such motion. As the stud 69 moves to the left the needle carrier 62 moves to the left under the influence of the coiled spring 65 72 between the needle carrier 62 and the

hammer casing 54 and this motion of the needle carrier to the left continues until the tapered end 171 of the needle shank 170, now in the groove 114 of the carrier 62, enters the cup-shaped die 76 and rests against 70 the walls of the opening or recess 126 therein. This movement of the needle carrier and the needle or shank secured thereto is diagrammatically illustrated in Figs. 12 and 13. The needle is thus held firmly against 75 the interior of the cup-shaped die 76 by the tension of the spring 72. This is the first operation which results from the rotation of the cam 43.

The second operation effected by the ro- 80 tation of the cam 43 in a clockwise direction is to bring the spring pressed tooth 44 into engagement with the hardened steel pin 61 projected laterally from the hammer head 55 through the slot 60 of the hammer casing 85 54, and after the flat radial face 47 of the tooth 44 comes into engagement with said pin 61 it moves the hammer to the right, against the action of the stiff hammer spring 59, thus compressing the said coiled spring 90 59. As the cam 49 continues its rotation, it passes below and out of engagement with the pin 51, whereupon the hammer spring 59 is free to act, and it impels the hammer head 55 to the left, striking a sharp heavy 95 blow on the needle carrier 62. During the time that the hammer head is being moved against the tension of the hammer spring 59 and before the hammer head is released from the tooth 44, the cam shoulder 128 (see 100 Fig. 5) on the lever 23 has come into engagement with the slidable rod 129, has pushed it longitudinally, and has turned the rock shaft 133, thus moving the arm 134 against the pin 135 carried by the depending lever 105 136, and swinging the lever 136 and the parts carried thereby to the left. This movement of the lever 136 is operative to feed the fine wire 173 from the reel 125, and between the tensioning parts of the tensioning de- 110 vice 160, and to push the free end of the fine wire 173 against the bottom of the channel or slot 172 in the tapered end of the shank 170 as is illustrated diagrammatically in Fig. 14 of the drawings. Substantially the in- 115 stant, however, the tungsten wire 173 has reached the position shown in Fig. 14, the hammer head is released from the tooth 44 and imparts its blow to the needle carrier. This blow forces the tapered end of the 120 shank 170 into the interior of the die 76. The said blow thus imparted to the stylus or shank 170, swages the metal of the tapered end 171 around the tungsten wire 173 thus inserted, closing the slot 172 and forc- 125 ing the metal around the tungsten stylus into exceedingly tight and rigid engagement therewith. The tungsten wire insert is thus made substantially integral or unitary with the steel shank 170. It may not be in fact 130

absolutely integral with it, but it is so tightly and firmly united therewith as to form a substantially unitary structure. Just after the pin 61 has been released from the tooth 44 and the hammer has struck its blow against the needle carrier, the projection 159 on the cam 43 comes into engagement with the block 158 on the lever 156 and pressing it downwardly draws downwardly the connecting bar 162 and the shearing lever 150 connected thereto and severs the tungsten wire at a short distance from the tapered end 171 of the shank 170.

It is immediately after the tungsten wire has been thus severed that the tooth 44 slips from under the pin 61; the cam lugs 18—18 effect a separation of the clutch members 9 and 12; and the shaft 13 is turned in an anti-clockwise direction under the influence of the resetting spring 32. In returning to its original position the tapered or inclined face 48 of the tooth 44, striking against the pin 61, forces the tooth 41 into the cam 43 against the action of the tensioning spring 46 and thus permits the uninterrupted movement of the shaft 13 until it has returned to its original position.

In returning to its original position, the projection 62 comes again into engagement with the lever 64 and turns the rock shaft 65 to move the needle carrier 62 back to its original position, shown in Fig. 5, and the return of the pusher rod 90 to its original position is the last operation effected during the movement of the shaft 13 in its reverse direction, and therefore the pusher rod 90 is operative to hold the completed needle in the groove 114. The first part of the movement of the lever 79 in its return motion moves the intermediate bell crank lever throwing the arm 123 away from the arm 104 of the bell crank lever 103, but the bell crank lever 103 is not free to move under the influence of the spring 115 because the hooked ends 113 of the needle ejecting fingers 108, 109 and 110 are under the needle, and the needle is held in the slot 114 by the pusher rod 90. Immediately, however, the pusher rod 90 moves to the rear and out of engagement with the top of the needle in the groove 114, the spring 115 draws the lever arm 105 sharply downwardly, rocking the bell crank lever 103 on its stud 106 and throwing the completed needle upwardly out of the machine with considerable force into a receptacle (not shown) suitably located with respect to the machine.

The transverse slot 172 in the end of the shank 170 may have parallel sides as shown in Figs. 10 to 14 but in order to insure the threading of the tungsten wire into the slot without striking against the forward edge of the tapered end 171, I prefer to provide the shank with a slot 172' slightly V-shaped as shown in Fig. 18. The bottom

of the slot 172' is of substantially the width of the diameter of the tungsten wire insert. The end of the shank provided with the slot 172' such as is shown in Fig. 18, is perhaps even more readily tightly swaged around a tungsten wire insert, in the machine, above described than is the shank having a parallel-sided slot 172. In any event, the slot 172' is substantially as readily entirely closed after the blow has been struck by the hammer 52 as is the slot 172 with substantially parallel sides.

The bottom of the slot 114 is of the same shape as one-half of the stylus shank and the depth of the slot 114 is substantially equal to the diameter or width of the stylus shank. When, therefore, the pusher rod 90 is over the slot 114 (see Fig. 9), the underside of the pusher rod bears against the top of the stylus shank, holding the shank tightly against the bottom of the groove in the carrier 62. In this way the shank is prevented from opening or springing laterally when the blow of the hammer 52 is imparted thereto. It is clear that the arrangement of the various mechanisms for performing the different operations illustrated herein may be widely varied within the scope of this invention as defined in the claims without departing from the spirit thereof and the form of mechanism which has been described and illustrated is merely one exemplification of the invention and it is not intended to limit the scope of the claims to the exact details shown herein.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. In a machine for making styli composed of a shank and a tip, the combination of a die, means for supporting and holding the shank forming material, means for holding the tip forming material, means for causing a relative movement between the respective holding means in the direction of the length of said shank material and in a line with the center of the die to bring said tip forming and shank forming material into endwise engagement, and means to deliver a swaging blow to join the tip and shank when the materials are in said engaging position.

2. In a machine for making styli composed of a shank and a tip of different material, the combination of a hollow die, means to hold the die and the material forming the stylus shank in operative engagement, means to feed through said die the material adapted to form the tip and bring said tip and shank material into position in which the shank incloses a part of the tip, and means to impart a blow to swage that part of said shank within the die around said tip and force it into tight holding unitary engagement therewith.

3. In a machine for making styli having a shank and a tip of different material, the combination of a hollow die, means to feed a length of tip forming material through
 5 said die, means supporting and holding the shank forming material, means for causing a relative movement between said last-mentioned means and said die in the direction of the length of the shank and in line with
 10 the center of the die to bring said tip and shank material into endwise engagement, and means to deliver a swaging blow to join the tip and shank when the materials are in said engaging position.
- 15 4. In a machine for making compound styli, the combination of a hollow die, means to feed a length of tungsten wire through said die, means to feed a length of shank material endwise in a line coincident with
 20 the line of feed of said wire to bring the wire and shank into endwise engagement, and means to deliver a swaging blow to said materials to join the wire and shank into tight holding relation.
- 25 5. In a machine for making compound styli, the combination of a hollow die, means to feed a length of tungsten wire through said die, means to feed a length of shank material endwise in a line coincident with
 30 the line of feed of said wire to bring the wire and shank into endwise engagement, and means to deliver an endwise swaging blow to said materials to join the wire and shank into tight holding relation.
- 35 6. In a machine for making styli for sound reproducing machines, the combination of a carrier, means for feeding a stylus shank to said carrier, a hollow die having an opening through the bottom thereof,
 40 means for moving said carrier to bring said shank into alined engagement with the interior of said die, said shank having a recess in the end thereof, means to insert a length of wire through said opening in said die into said recess in said shank, and
 45 means to impart a blow to said shank to force the material of the end of the said shank into tight holding engagement with said wire.
- 50 7. In a machine for making styli for sound reproducing machines, the combination of a carrier, means for feeding a stylus shank to said carrier, a hollow die having an opening through the bottom thereof,
 55 means for moving said carrier to bring said shank into alined engagement with the interior of said die, said shank having a recess in the end thereof, means to insert a length of wire through said opening in said die into said recess in said shank, means to impart a blow to said shank to force the material of the end of the said shank into tight holding engagement with said wire, and means to sever said wire at a short distance from the end of said shank.
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8. In a machine for making styli for sound reproducing machines, the combination of a carrier, means for feeding a stylus shank to said carrier, a hollow die having an opening through the bottom thereof, means for moving said carrier to bring said shank into alined engagement with the interior of said die, said shank having a recess in the end thereof, means to insert a length of wire through said opening in said die into said recess in said shank, means to impart a blow to said shank to force the material of the end of the said shank into tight holding engagement with said wire, means to sever said wire at a short distance from the end of said shank, and means to move said carrier and said stylus away from said die.
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9. In a machine for making styli for sound reproducing machines, the combination of a carrier, means for feeding a stylus shank to said carrier, a hollow die having an opening through the bottom thereof, means for moving said carrier to bring said shank into alined engagement with the interior of said die, said shank having a recess in the end thereof, means to insert a length of wire through said opening in said die into said recess in said shank, means to impart a blow to said shank to force the material of the end of the said shank into tight holding engagement with said wire, means to sever said wire at a short distance from the end of said shank, means to move said carrier and said stylus away from said die, and means to eject from said carrier the stylus so formed and provided with a record-engaging end unitary therewith.
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 95
 100
10. In a machine for making styli for sound reproducing machines, the combination of a stylus carrier, having a groove therein, means to feed a stylus shank into said groove, said groove being of a shape to fit and conform to the shape of one-half of said stylus and of a depth equal to the thickness of said stylus, means to hold said stylus in said groove, a die in alinement with said stylus in said groove and provided with an opening in the bottom thereof, means to move said die to bring the end of said stylus into engagement with the interior of said die, means to feed a fine tungsten wire through the opening in said die and into a recess in the adjacent end of said stylus, and means to strike a swaging blow against said carrier and stylus carried thereby to force the end of said stylus within said die into tight holding relation with respect to said tungsten wire.
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11. In a machine for making styli for sound reproducing machines, the combination of a stylus carrier, having a groove therein, means to feed a stylus shank into said groove, said groove being of a shape to fit and conform to the shape of one-half of said stylus and of a depth equal to the
 125
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thickness of said stylus, means to hold said stylus in said groove, a die in alinement with said stylus in said groove and provided with an opening in the bottom thereof, 5 means to move said die to bring the end of said stylus into engagement with the interior of said die, means to feed a length of tungsten wire through the opening in said die and into said groove in the end of said 10 stylus, means to strike a swaging blow against said carrier and stylus carried thereby to force the end of said stylus within said die into tight holding relation with respect to said tungsten wire, and means to 15 sever said tungsten wire at a point spaced from the end of said shank.

12. In a machine for making styli for sound reproducing machines, the combination of a shank holder, means for feeding 20 the shank material to said holder, a hollow die having an opening through the bottom thereof, means to bring the shank held in said holder and die into alined engagement, means to feed a length of wire through said 25 opening in said die, said wire adapted to be inserted into a recess in the shank, means to impart a blow to the shank to force the material of the end of the shank into tight holding engagement with said wire, and means 30 to sever said wire at a short distance from the end of the shank.

13. In a machine for making styli for sound reproducing machines, the combination of means to hold the stylus shank, 35 means to feed the shank to said holding

means, a hollow die having an opening through the bottom thereof, means for bringing the shank held in said holder and die into alined engagement, means to feed 40 a length of wire through said opening in said die, said wire adapted to be inserted into a recess in the shank, means to impart a blow to said shank to force the material of the end of the shank into tight holding engagement with said wire, means to sever said 45 wire at a short distance from the end of the shank, and means to separate the shank and die from alined engagement.

14. In a machine for making styli for sound reproducing machines, the combination of means to hold the stylus shank, 50 means to feed the shank to said holding means, a hollow die having an opening through the bottom thereof, means for bringing the shank and die into alined engagement, means to insert a length of wire 55 through said opening in said die, said wire adapted to be inserted into a recess in the shank, means to impart a blow to said shank to force the material of the end of the shank into tight holding engagement with said 60 wire, means to sever said wire at a short distance from the end of the shank, means to separate the shank and die from alined engagement, and means to remove from the holder the stylus so formed. 65

In witness whereof, I have hereunto set my hand this 27th day of April, 1916.

WILLIAM W. MOYER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND PRODUCING DEVICE.

1,251,918 ----- H. H. Pratley.

Patented Jan. 1, 1918.

Filed Jan. 10, 1916.

H. H. PRATLEY.
SOUND PRODUCING DEVICE.
APPLICATION FILED JAN. 10, 1916.

1,251,918.

Patented Jan. 1, 1918.

Fig. I.

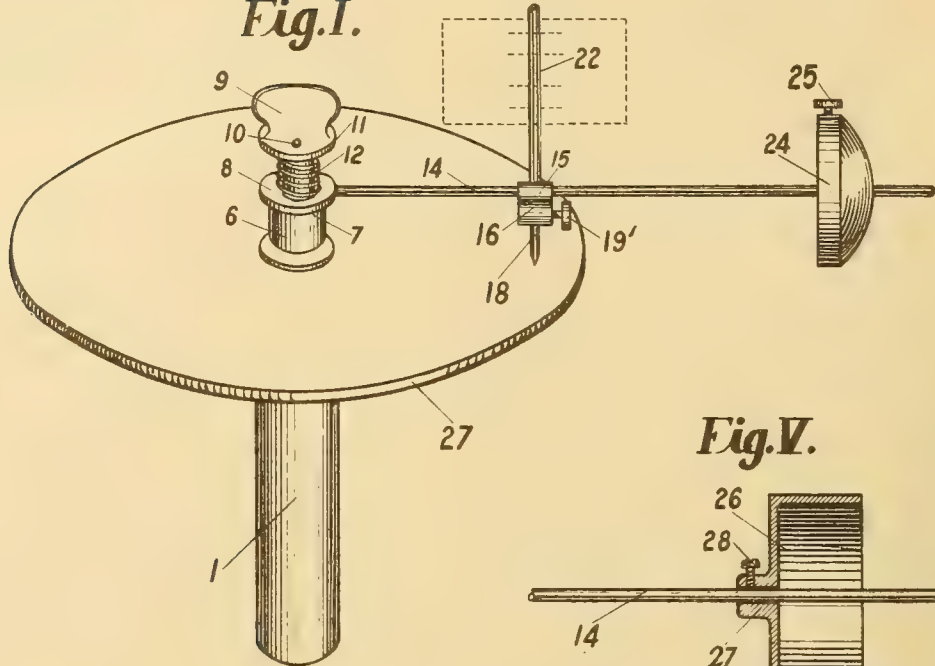


Fig. V.

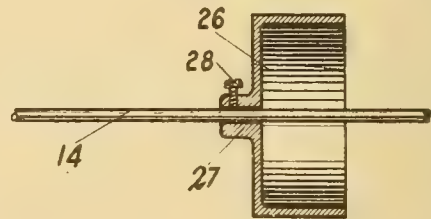


Fig. II.

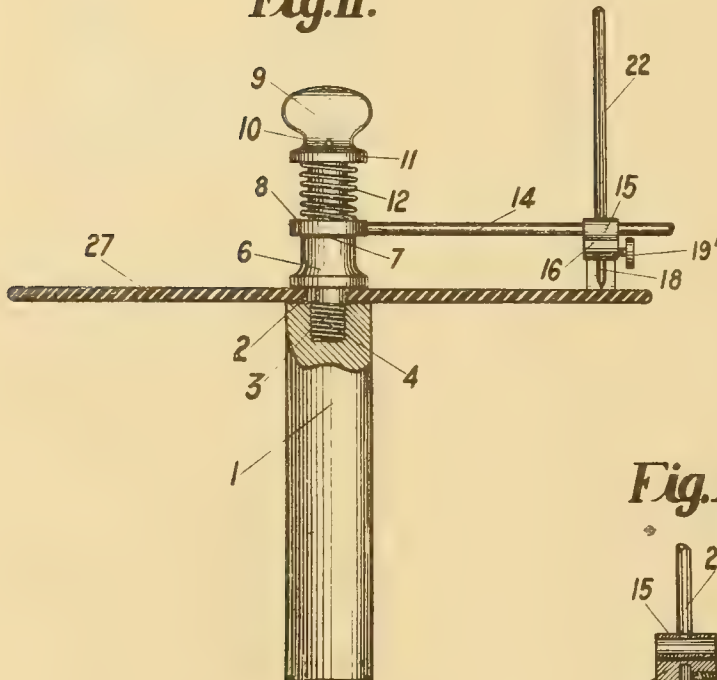


Fig. III.

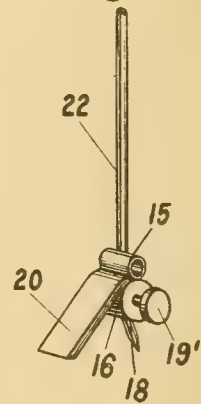
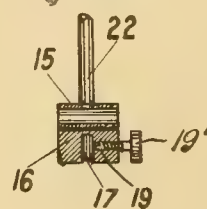


Fig. IV.



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SOUND-PRODUCING DEVICE.

1,251,918.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed January 10, 1916. Serial No. 71,212.

To all whom it may concern:

Be it known that I, HARRY H. PRATLEY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Sound-Producing Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to sound producing devices and has for its principal object to provide a simple and inexpensive device whereby the sound recorded on a disk or like record may be reproduced.

In accomplishing this object I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:—

Figure I is a perspective view of a sound reproducing device constructed according to my invention.

Fig. II is an elevation of the same, the record and a part of the handle member being in section to better illustrate the clamping of the record on the handle.

Fig. III is a detail perspective view of the needle slide.

Fig. IV is a longitudinal section of the same.

Fig. V is an elevation of a part of the slide rod, showing a modified form of amplifier.

Referring more in detail to the drawings:—

1 designates a handle member which may be of any suitable shape and material, but having a flat top 2 provided with a socket 3 that is threaded to receive the left hand threaded shank 4. Fixed on the shank 4, at a distance from the threaded end thereof, is a stop boss 6, which is of sufficiently greater diameter than the post to form a contacting surface thereabout for bearing against a disk record when the latter is applied to the handle, as will presently be described, and which preferably comprises a sleeve, the outer edge of which forms a seat 7 upon which a vibrator rod collar 8 is adapted for support.

The post 4 extends outwardly beyond the

collar and sleeve and at its outer end is provided with a wing or like handle 9 which is anchored to the post, preferably by means of a pin 10, so that it will not turn thereon and whereby the post may be threaded into the handle 1 or held when the handle is threaded onto the post. The collar 8 is loosely mounted on the post and adapted for freely seating on the seat 7, and surrounding the post and bearing against the flange 11, on the wing handle 10, and on the upper face of the collar is a coil spring 12 which is adapted for yieldingly retaining the collar 8 to its seat and for providing limited freedom of movement on the post, so that it may rise or rock thereon.

The collar 8 carries a rod 14 which may be of a suitable length to extend beyond the edge of the record on the handle member, and slidably mounted on said rod is a sleeve 15, the fit of the sleeve on the rod being sufficiently loose to allow the sleeve to slide freely over the rod but sufficiently close to transmit vibrations from the sleeve to the rod.

Suspended from the sleeve 15 is a barrel 16, having a transverse socket 17 therein that extends upwardly at an angle in order to seat a needle 18 in proper position for following grooves in a round record, and extending longitudinally through the barrel and into the socket, is a threaded bore 19 that is adapted for carrying a set screw 19' whereby the needle 18 may be firmly fixed in the barrel. Attached to the barrel and collar 15 and extending at substantially a right angle to the needle is a shoe 20 which is adapted for travel along the face of a record to assist in supporting the rod 14 and for retaining the angle of the needle relative to the record in order to insure a proper reproduction of sound.

In order to amplify the reproduction of sound from the record I provide for carrying an amplifier, such as a piece of parchment or the like, indicated in dotted lines in Fig. I, by mounting a post 22 on the collar 15 so that vibrations from the needle are conducted through the mounting collar and post 22 to the amplifier.

As will presently be more fully described, the sound is reproduced by means of the needle 18 and instead of the record being moved along the needle, as in the usual type of reproducers, I move the needle along the record by swinging the rod 14 about its

central mounting. In order however to insure a proper travel of the rod I place a weight 24 on the end of the rod, and preferably anchor the weight adjustably by means
5 of a set screw 25, so that it may be moved along the rod and fixed in any desired position thereon.

The weight may consist of a member corresponding to that shown in Fig. V wherein
10 it comprises an amplifier 26 of any suitable shape or material, and which is preferably provided with a neck 27 through which a set screw 28 is extended into engagement with the carrying rod.

15 In using the device, assuming that the parts are constructed and assembled as described, a record disk 27, having the usual central aperture is moved onto the post 4 so that the shank will project through the
20 disk aperture. The handle is then screwed onto the shank until its seat bears against the bottom of the disk and binds the disk firmly between the end of the handle and the boss 6. A needle is then placed in the
25 barrel 16 and fastened by means of the set screw and the sleeve moved along the rod so that the needle may be located in an outer groove of the record. If the weight on the rod 14 comprises the amplifier, no additional
30 member for accomplishing this purpose is required, but a piece of paper or parchment, or other like material may be placed on the post 22 in order to amplify the sound.

With the parts arranged as described, the
35 operator grasps the handle 1 firmly and rotates it in order to throw the arm 14 around the disk, so that it travels on its pivotal mounting on the post and moves the needle through the spiral groove in the disk.
40 When the needle moves through the groove it engages the projections thereon so that the needle is vibrated from the record and the vibrations conducted from the needle to the sleeve and rod, and thence to the ampli-
45 fier, so that the record is reproduced and sounded.

By mounting the sleeve 15 slidably on the rod the sleeve may move inwardly automatically as the needle follows the groove, and
50 by mounting the collar 8 loosely on the post 4 a certain freedom of movement is permitted that will prevent possible damage or stiffness in the operation of the device, the spring 12 holding the rod to position
55 and permitting the free rotation of the rod and limited movement thereof. As the threads 4 on the post 3 are left-hand threads and as the needle is moved about to the right, it is apparent that the friction of the
60 needle on the disk will not tend to loosen the disk from its mounting but on the contrary will tend to tighten the same, so that there is no danger of the disk becoming
65 loosened to interfere with the proper operation of the needle.

The collar 15 and the parts directly connected therewith are of such light weight that they are subject to slight interference from centrifugal force, but, on the contrary
70 may move inwardly, against such force, under the guiding influence of the needle in the record groove.

It is further apparent that by providing the barrel 16 with the shoe 20 the needle is stabilized during its movement in order to
75 produce an even and clear reproduction.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters-Patent, is:—

1. The combination with a disk holder, of
80 a needle carrying device rotatably mounted relative to the disk holder, and yielding means for retaining the said device in functional position.

2. The combination with a handle mem-
85 ber, of means for clamping the disk to the handle member, a rod pivotally mounted on said means, and a collar slidably mounted on the said rod and adapted for supporting a needle, the said collar comprising a mem-
90 ber for wiping the disk during travel of the rod.

3. The combination of a handle member, of means for clamping a disk to the handle member, a rod pivotally mounted on said
95 means, a collar slidably mounted on the rod and adapted for supporting a needle, and means on said collar for carrying an amplifier.

4. The combination with a handle mem-
100 ber, of means for clamping a disk to the handle member, a rod pivotally mounted on said means, a collar slidably mounted on said rod and adapted for supporting a needle, and a weight adjustably mounted on
105 said rod.

5. The combination with a handle member, of means for clamping a disk to the handle member, a rod pivotally mounted on said means, a collar slidably mounted on
110 said rod and adapted for supporting a needle, and a spring for urging the collar to functional position.

6. The combination with a handle, of a post removably mounted on the handle and
115 adapted for clamping a disk thereto, a collar pivotally mounted on the post, a rod on said collar, a sleeve slidably mounted on the rod and adapted for carrying a needle, and a weight on said rod.
120

7. The combination with a handle, of a post removably mounted on the handle and adapted for clamping a disk thereto, a collar pivotally mounted on the post, a rod on said
125 collar, a sleeve slidably mounted on the rod and adapted for carrying a needle, and a weight adjustably mounted on said rod.

8. The combination with a handle, having a screw threaded socket, of a post having a threaded shank adapted for seating in said
130

socket, a protuberance on said post adapted for binding a disk against the handle, a collar loosely mounted on the post and seated on said protuberance, a member on the outer
5 end of the post, a spring surrounding the post and bearing against said member and against the collar, a rod on said collar, and a sleeve slidably mounted on the rod and adapted for carrying a needle.
10 9. The combination with a handle, having a screw threaded socket, of a post having a threaded shank adapted for seating in said socket, a protuberance on said post adapted for binding a disk against the handle, a collar
15 loosely mounted on the post and seated on said protuberance, a member on the outer end of the post, a spring surrounding the

post and bearing against said member and against the collar, a rod on said collar, a sleeve slidably mounted on the rod and
20 adapted for carrying a needle, and a shoe on said sleeve adapted for wiping engagement with the disk when the device is in operation.

10. The combination with a handle, of a
25 post removably mounted on the handle and adapted for binding a disk thereto, a rod pivotally mounted on the post, means slidably mounted on the rod for carrying a needle, and an amplifier adjustably mounted on
30 the rod.

In testimony whereof I affix my signature.

HARRY H. PRATLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SPRING MOTOR.

1,251,972 ----- G. R. Kunkle,
Patented Jan. 1, 1918.
Filed Jan. 24, 1917.

1,251,972.

Patented Jan. 1, 1918.

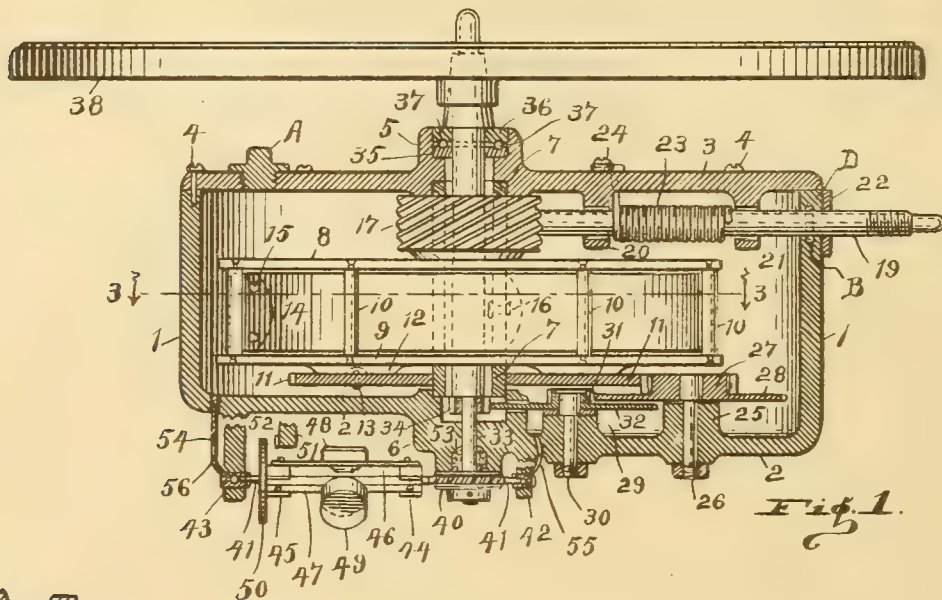


Fig. 1.

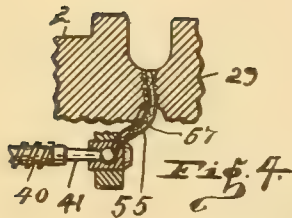


Fig. 4.

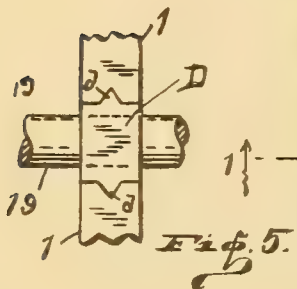


Fig. 5.

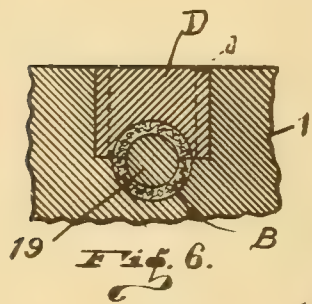


Fig. 6.

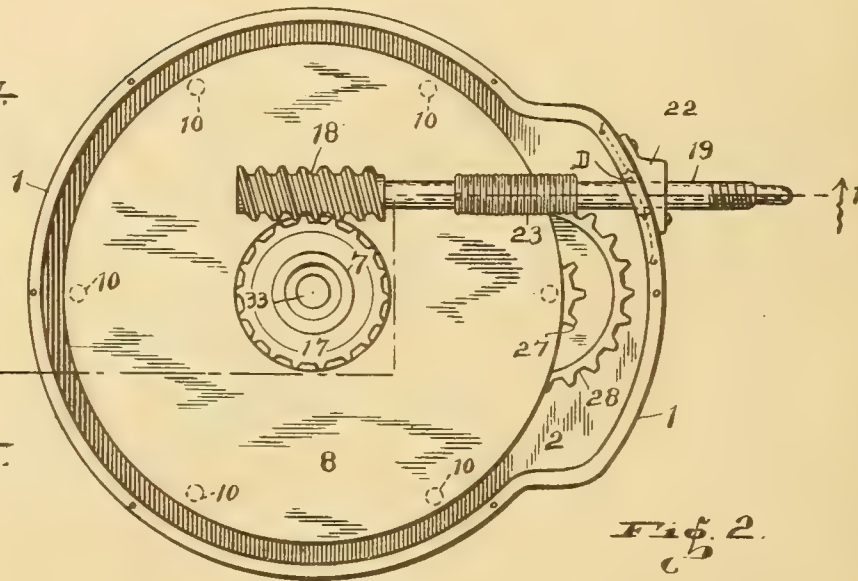


Fig. 2.

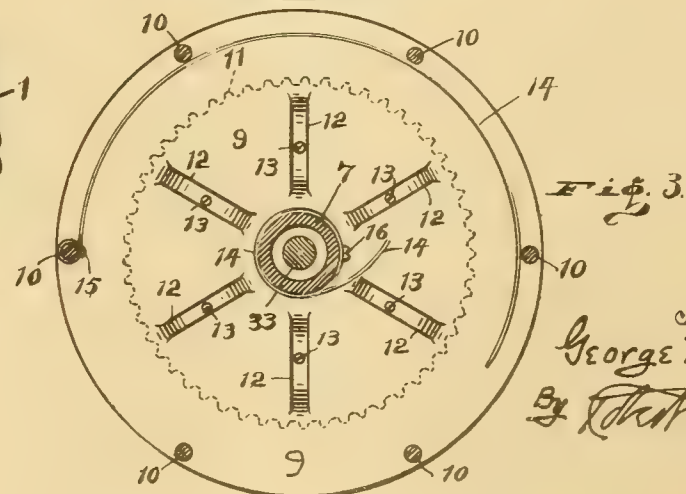


Fig. 3.

Odelaide Kearns,
 Draftsman.

Inventor:
 George R. Kunkle;
 By Robert W. Naudle
 Attorney.

UNITED STATES PATENT OFFICE.

GEORGE R. KUNKLE, OF RICHMOND, INDIANA.

SPRING-MOTOR.

1,251,972.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed January 24, 1917. Serial No. 144,285.

To all whom it may concern:

Be it known that I, GEORGE R. KUNKLE, a citizen of the United States, residing in the city of Richmond, in the county of Wayne, State of Indiana, have invented new and useful Improvements in Spring-Motors, of which the following is a full, clear, and comprehensive specification and exposition, the same being such as will enable others to make and use the same with exactitude.

The object of my invention, broadly speaking, is to provide a spring motor which will be simple in construction and compact in its arrangement, will be strong and durable in its several parts, easily operated and controlled, which can be manufactured, installed, and sold at a comparatively low price, and above all will be absolutely noiseless in its operation.

Other objects are, to provide a spring motor which will be positive in action, regular in its operations, and automatic as to the oiling of the several bearings thereof.

Other minor objects and particular advantages of the invention will be brought out in the course of the following description, and that which is new will be correlated in the claims.

The preferred means for carrying out the principles of the invention is shown in the accompanying drawings, in which—Figure 1 is a vertical section taken through the case and certain of the mechanism therein, as on the line 1—1 of Fig. 2. Fig. 2 is a top plan view, looking down into the case after the lid or cover has been removed. Fig. 3 is horizontal section, as taken on the line 3—3 of Fig. 1, and taken in the direction indicated by the arrows. Fig. 4 is an enlarged detail section of one of the governor oilers. Fig. 5 is a plan view of the outer bearing for the winding-shaft. And Fig. 6 is a sectional view of the outer bearing for the winding-shaft, as taken on the line 6—6 of Fig. 2.

Similar indices denote like parts throughout the several views.

In order that the construction, the operation, and the advantages of my invention may be more fully understood and appreciated I will now take up a detailed description thereof, in which I will set forth the

several features as briefly and as comprehensively as I may.

Referring now to the drawings in detail: The container or case is substantially round in cross section, with a swell or enlargement on one side thereof in order to accommodate certain of the gears, and it comprises the side wall 1 and the bottom 2 which is integral with the side wall, thereby providing a bowl-shaped reservoir substantially as indicated. Numeral 3 denotes the lid or cover, which is removably secured on the upper edge of the wall 1, where it is adapted to be secured by a plurality of screws 4. At any convenient point in the top 3 a cap or filler-plug A is threaded therethrough, as shown for instance in Fig. 1.

Located near the center of the cover 3 is the hub 5, which is integral therewith, and opposite thereto in the bottom 2 is the hub 6. Mounted in suitable spaces therefor in the inner ends of the hubs 5 and 6, and extending vertically therebetween, is the hollow shaft or spindle 7.

The spring barrel or cage comprises an upper disk 8 and a lower disk 9, the two being spaced apart, parallel with each other, and they are rigidly connected together by a plurality of posts 10. The barrel or cage thus formed is located around and concentric with the hollow shaft 7 upon which it may freely revolve.

Numeral 11 denotes the main drive gear wheel, shown in dotted lines in Fig. 3, and it also is concentric with the shaft 7, and it is concentric with the spring barrel, below which it is located, and to which it is rigidly secured as follows: Struck down through the disk 9 are a plurality of oblong radial depressions 12, the bottoms of which contact with the upper face of the gear 11, to which they are secured by screws or rivets 13, substantially as indicated.

Numeral 14 denotes a flat coiled spring, one end of which is secured around one of the posts 10 by one or more rivets 15. Said spring is coiled around inside the barrel with its inner end secured to the hook 16, the latter being secured to the shaft 7 in any well known manner.

Located immediately above the barrel, concentric therewith, and secured to the

shaft 7, is the spiral gear 17. Numeral 18 denotes a spiral gear screw, which is located at one side of and at right angle to and in mesh with the gear 17, as in Fig. 2.

5 Said screw 18 is secured on the inner end of the winding-shaft 19, the latter being revolvably mounted in the hangers 20 and 21 which extend down from the lid 3. The shaft 19 projects out through an aperture therefor in the wall 1, where it is provided with a plate 22. The outer end of the shaft 19 is adapted to receive a crank by which the said shaft may be rotated, as hereinafter set forth.

15 Coiled tightly around the shaft 19 and extending between the hangers 20 and 21 is a coil spring 23, one end of which is run up through the cover 3 and secured by the screw 24, while the other end of the spring remains free. From the above it is apparent that the shaft 19 may be freely rotated to the right, as will incline to unwind or loosen the convolutions of the spring 23, but the shaft can not be rotated to the left as this will tend to contract the coils of the spring and cause them to grasp the shaft, thereby preventing the shaft from rotating reversely.

30 A notch is formed in the upper edge of the wall 1, in the base of which notch fits the shaft 19, and closing said notch, after the said shaft is in position, and fitting said shaft, is the block D. The said block has a V-shaped fin *d* in each side edge thereof and the fins are adapted to slide down and fit in corresponding grooves formed in each side edge of the said notch, as indicated.

35 A channel is formed in the contact face of the block D and in the base of said notch in which is located the packing B.

40 It is apparent that the block D and the packing B are held tight in place when the lid or cover 3 is secured as in Fig. 1.

45 Extending up from the bottom 2 is the hub 25, and extending through said hub is the axle 26, on which is mounted the pinion 27 and the gear-wheel 28. The said pinion and gear-wheel being integral and concentric with each other, and they rest upon the upper end of the hub 25. The pinion 27 is located in mesh with the gear-wheel 11 and is driven thereby, as hereinafter followed out.

50 Also extending up from the bottom 2 is the hub 29, and extending through the hub 29 is the axle 30, on which is mounted the pinion 31 and the gear-wheel 32, the two being integral with each other, and they rest upon the upper end of the hub 29.

60 The gear-wheel 28 meshes with the pinion 31 which it drives.

Extending through beyond the shaft 7 is the driven shaft 33, the lower end of the shaft 33 is mounted in the hub 6, through

which it extends, and its upper end is carried by the hub 5, in the manner hereinafter specified.

Secured around the shaft 33 immediately adjoining the lower end of the shaft 7, is the pinion 34 which meshes with the gear-wheel 32 and by which it is driven.

At a point above the shaft 7 the shaft 33 is supported and centered by a ball-bearing which is located in the outer end of the hub 5. The lower ball-race 35 is secured in the hub 5, while the upper ball-race 36 is secured around the shaft 33, with the balls 37 operating in the race-way therebetween, as shown.

Mounted on the upper end portion of the shaft 33, and above the hub 5, is the turntable 38, which is the element to be driven.

Secured on the lower projecting portion of the shaft 33 is the spiral-gear 39 with which meshes at right-angles thereto the spiral-screw 40. The screw 40 is secured on the governor-shaft 41, the latter being revolvably mounted at its ends in the bearings 42 and 43 in any well known manner.

The governor comprises a fixed spider 44 secured to the shaft 41 and located near the screw 40, and a slidable spider 45 which is movable along on said shaft 41. Connecting said spiders are the thin springs 46 and 47 and they normally extend parallel with the shaft 41. Secured to the center of each of the springs 46 and 47 are the respective weights 48 and 49. Secured to the spider 45 and revoluble therewith and slidable on the shaft 41 is the disk 50.

Numeral 51 denotes a projection from the bottom 2, and on its face is a felt pad 52 against which the disk 50 is adapted to engage when the disk is moved to the right a short distance.

The lower end of the shaft 33 is provided with packing 53 to prevent the escape of oil. Also packing B should be placed around the shaft 19 where it passes through the wall 1, in order to prevent the escape of oil at that point.

Leading from the interior of the case are two pipes or ducts 54 and 55, which extend into the respective bearings 43 and 44, to supply oil to the ends of the shaft 41. Wicks 56 and 57 should be placed in each of the ducts to retard the oil beyond that required to properly oil the ends of the shaft 41.

After the mechanism is assembled as shown and described the filler plug A may be removed and the interior of the case should be filled, or nearly so, with suitable fluid oil, then after the plug A is replaced the motor will be ready for operation to function in the manner for which it is intended.

First the spring 14 should be wound to the desired tension, by simply turning the

shaft 19 to the right, which manifestly will cause the gear 18 to turn the gear 17 and it in turn will rotate the hollow shaft 7, thereby causing the spring to wind from the center thereof.

After the spring is wound then the power thereof will be exerted to turn the barrel, carrying with it the gear 11, from which the power will be exerted through the intermediate gears to the pinion 34, and the latter will of course turn the shaft 33 and the latter will carry with it the turn-table 38, thereby accomplishing the desideratum of the mechanism. Now as the mechanism speeds up to a certain rate the centrifugal force of the rotating weights 48 and 49 will bow out the springs 46 and 47, thereby bringing the disk 50 into frictional contact with the felt 52 and thereby reduce the speed, or rather holding the speed at a uniform rate.

As probably will have been observed, the most prominent features of this invention are: (a) The means whereby various mechanisms operate continuously in fluid oil, thereby minimizing the noise which would result from the operation of the mechanism, also dispensing with the necessity of frequent oiling, and adding to the life of the mechanism; (b) The hollow axle to which the inner end of the power spring is attached, with the driven shaft extending through the hollow shaft, thereby enabling the mechanism to be arranged in compact form, causing the mechanism to be more simple than it otherwise would be, and reducing the cost of production to an appreciable extent; and (c) The novel means for oiling the governor, which of necessity is located outside of the oil case.

I desire that it be understood that various changes may be made in the several details of construction and arrangement without departing from the spirit of the invention and without sacrificing any of the advantages thereof.

Having now fully shown and described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A spring motor comprising an inclosed case, a vertical hollow shaft located entirely within the case, a spring-cage revolubly mounted around and concentric of said shaft, a coil spring located in said cage with its inner end secured to said shaft and its outer end secured to the cage, a main drive gear located below said cage and secured thereto, a driven shaft extending through the hollow shaft and without contact therewith and projecting through the case both above and below, a ball-bearing carried by the upper part of the case by which the driven shaft is suspended, a turn-table se-

cured to the upper projecting end of the driven shaft, a governor connected to the lower projecting end of the driven shaft, a spiral gear located in the case above said cage and secured to the hollow shaft, a spiral gear meshing at right-angles with the first mentioned spiral gear, a winding shaft extending outside the case from the second spiral gear, a pinion secured to the driven shaft below the hollow shaft, and a train of gears connecting said pinion with said main drive gear, all substantially as set forth.

2. A spring motor comprising a case including a removable cover, a hub in said cover, a ball-bearing mounted in the hub, a driven-shaft supported by said ball-bearing and projecting through the case both above and below, a hollow shaft mounted entirely in the case concentric with the driven shaft but spaced therefrom, means for manually revolving the hollow shaft, a spring cage adapted to revolve around the hollow shaft concentric therewith but independent thereof, a coil spring contained in said cage with its inner end attached to the hollow shaft and its outer end attached to said cage, a main gear wheel located below said cage, depressions extending down from the cage, means for securing the depressions to said main gear, a pinion secured to the driven shaft immediately below the lower end of the hollow shaft, a pinion meshing with the main gear, a second gear integral with the last mentioned pinion, a pinion meshing with said second gear, a third gear integral with the last mentioned pinion and meshing with the said pinion attached to the driven shaft, all of the intermediate gears and pinions being located to one side of the driven shaft, and a governor located below the case and on the side of the driven shaft opposite to that of said gears and pinions, all substantially as set forth.

3. A spring motor including a case having a removable cover, a hub integral with the cover, a driven shaft projecting through the hub and the interior of the case and projecting below the case, means for suspending the said shaft in vertical rotative position, a turn-table attached to the upper projecting end of said shaft, a governor geared to the lower projecting end of said shaft, a hollow shaft concentric of the driven shaft and spaced therefrom and having its ends located in bearing within the case and adapted to rotate in one direction only, means for manually rotating the hollow shaft, a spring cage concentric of and having the hollow shaft as its axis, said cage comprising an upper disk, a lower disk spaced from the upper disk, a post connecting the peripheries of said disks, a spring contained in said cage with its inner end connected to the hollow shaft and with its outer end con-

5 nected to one of said posts, a main gear
connected concentric of and below said cage
and carried thereby, a pinion secured to the
driven shaft and adjoining the lower end
10 of the hollow shaft, a pair of intermedi-
ate pinions, and a pair of intermediate
gears, meshing together and with the main
gear and the first mentioned pinion, axles
for said intermediate gears and pinions
15 which axles are secured in the bottom of the

case, and spiral gears connecting the driven
shaft and the governor, all substantially as
shown and described.

In testimony whereof I have hereunto
subscribed my name to this specification in 15
the presence of two subscribing witnesses.

GEORGE R. KUNKLE.

Witnesses:

ROBT. W. RANDLE,
R. E. RANDLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

DISK RECORD FILING DEVICE.

1,252,078 ----- G. E. Bender,
Patented Jan. 1, 1918.
Filed June 28, 1915.

APPLICATION FILED JUNE 28, 1915.

1,252,078.

Patented Jan. 1, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

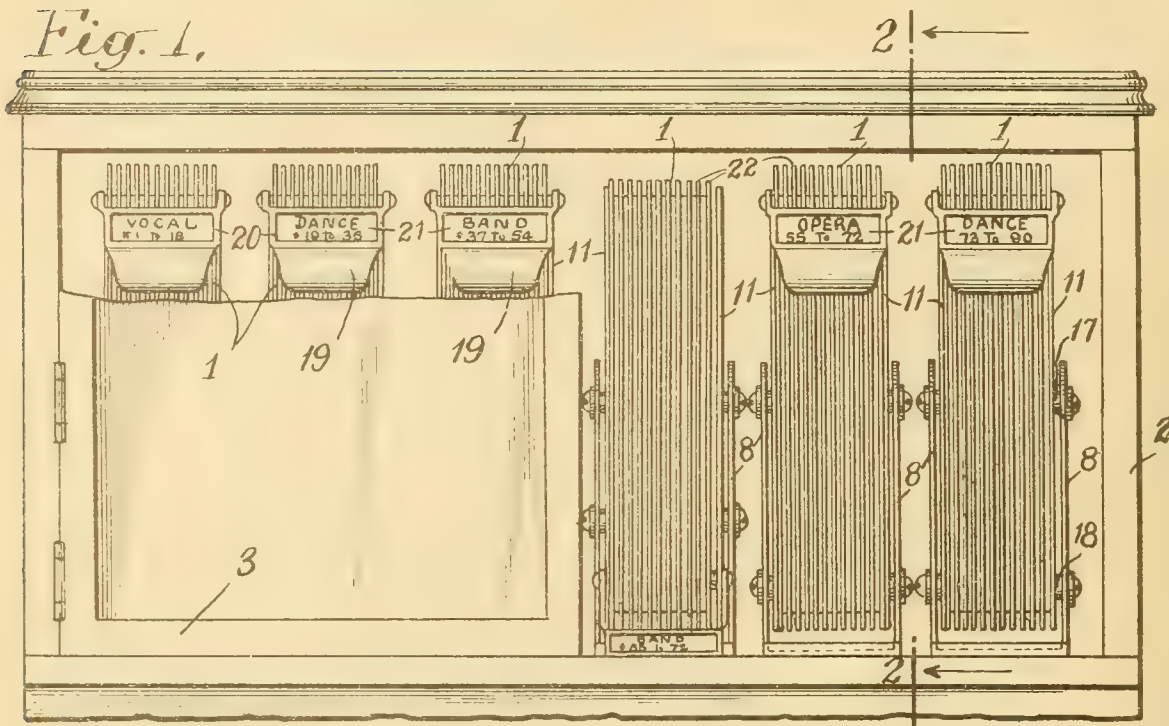
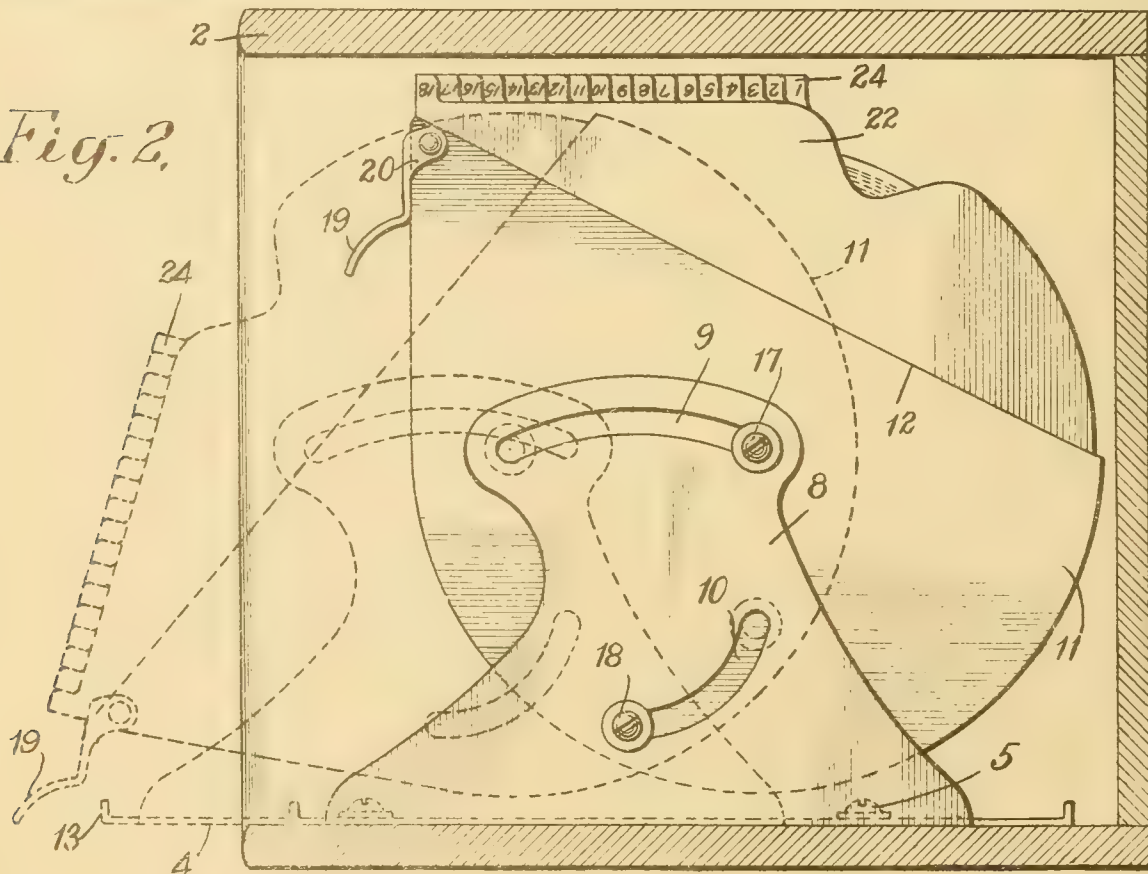


Fig. 2.



INVENTOR

INVENTOR
George E. Bauder
BY J. A. Edwards
ATTORNEY

ATTORNEY

1,252,078.

Patented Jan. 1, 1918.
2 SHEETS—SHEET 2.

Fig. 3.

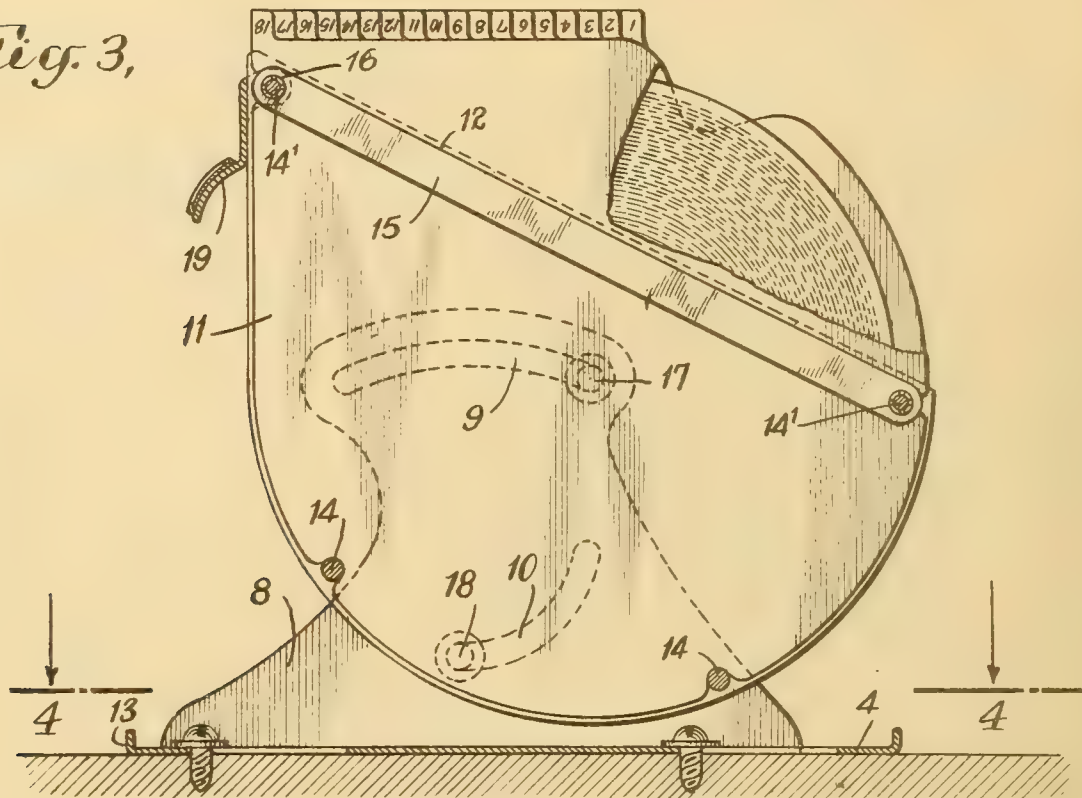


Fig. 4.

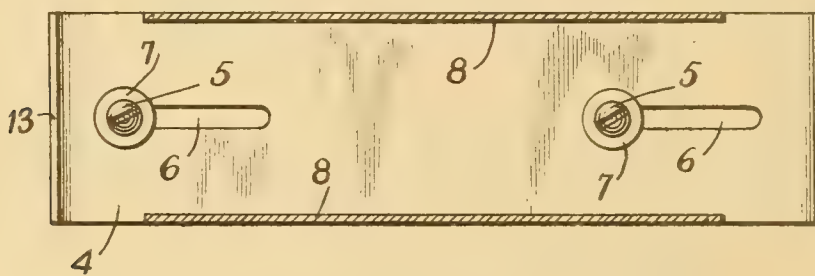
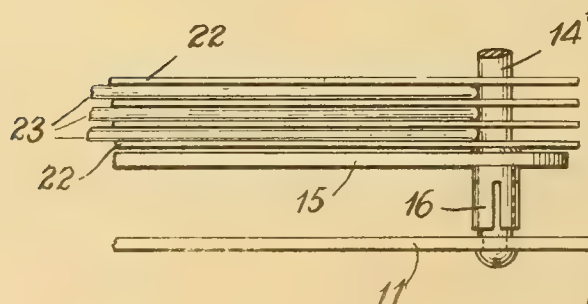


Fig. 5.



INVENTOR
George E. Bender
BY *J. O. Edwards*
ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE E. BENDER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-THIRD TO FRED G. RAPP, OF CHICAGO, ILLINOIS.

DISK-RECORD-FILING DEVICE.

1,252,078.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed June 28, 1915. Serial No. 36,681.

To all whom it may concern:

Be it known that I, GEORGE E. BENDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Disk-Record-Filing Device, of which the following is a specification.

My invention relates to filing devices which are particularly designed for holding disk talking-machine records, my filing device being, however, also adapted for filing papers or other flat objects. My invention comprises a filing unit, or a series of similar units, preferably formed of sheet metal and particularly adapted for the ready and rapid removal from or insertion in the same of a desired record or the like. A series of units each adapted to hold a desired class or group of records may be mounted in a suitable cabinet from which a desired unit may be partly withdrawn and depressed to a convenient position for removing a record therefrom by a continuous movement of the hand. Each unit comprises a holder comprising side plates connected by cross-bars and preferably provided with a hand-grip and an index or name-plate in front, the holder being so mounted between the standards that depression of the hand-grip serves both to rock the holder about its axis and to move the axis of rotation of the holder forwardly. By this means the holder is lowered into a position such that a record may be removed by a forward movement of the hand, the holder also being somewhat projected from the front of the cabinet to render the selection of a record more easy. Also, preferably each holder or unit is mounted on a sliding tray which is moved forwardly a limited distance by the same manipulation of the hand-grip which advances and oscillates the holder relative to the tray. The combined movement of the holder referred to is effected in the preferred form of my invention by providing the side plates of the holder with pivot pins axial with the holder, which pins are mounted in supporting slots in the standards, extending in a rather flat curve from front to back. Each side plate of the holder is also provided with a guiding pin mounted in a second curved slot in the adjacent

standard, these slots being so disposed as to cause the partial rotation of the holder at the same time the pivot pins thereof are moved forwardly in their slots.

A construction such as that briefly described remains in stable equilibrium in any position. The objects of my invention are to provide a device of the general character referred to having the advantages and constructional features more fully described hereinafter and particularly claimed in the appended claims.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming part of this specification and illustrating certain embodiments of my invention. In the drawings Figure 1 represents a front elevation of a cabinet with the front wall partly broken away to show a number of my improved record filing units mounted therein, Fig. 2 is a vertical section through the cabinet taken on line 2—2 of Fig. 1, showing one of the units in side elevation, Fig. 3 is a vertical section taken through one of the units inside a side plate of the same, Fig. 4 is a horizontal section taken on line 4—4 of Fig. 3 and Fig. 5 represents a detail of construction.

Referring to the drawings, a number of units 1, 1 are represented as mounted in a cabinet 2 having a front door 3. Each unit comprises a tray 4 slidably mounted on the bottom of the cabinet by means of screws 5 extending upwardly from the bottom of the cabinet through slots 6 in the tray, so that the latter is free to move forward and back the length of slots 6, said screws 5 having washers 7 above the slots. The tray 4 may be formed of sheet-metal and preferably has the standards 8 formed integral therewith. These standards 8 mounted at or rising from each side of a tray each have curved slots 9 and 10 therethrough.

Each holder comprises a pair of sheet-metal side plates 11, 11 which are curved to the arc of a circle at their lower edges and preferably are given straight upper edges 12 a short distance above the center of curvature of the side plates, so that disk records placed therein may extend out of the holder beyond the edges 12. The tray 4 is pref-

erably provided with a front flange 13 which may be grasped if desired to draw the tray forwardly.

The side plates 11 of each unit are held in position by a number of cross-bars 14 extending between the same, a pair of which bars designated 14', 14' extend through the edges of the side plates adjacent to the straight upper edges 12 thereof. A metal strip 15 is preferably frictionally mounted on rods 14', 14' to hold the records in each holder closely together in vertical position, regardless of the number of records in the holder. The desired frictional contact of strip 15 with rods 14' may be provided by securing a sleeve 16 to strip 15 at each end of the latter, these sleeves bearing frictionally upon rods 14'.

Each side plate 11 is provided with a pivot pin or screw 17 extending outwardly from the side plate in the line of the axis of rotation thereof through the curved supporting slot 9 of the adjacent standard 8. Each side plate is also provided with a guiding pin 18 extending through the slot 10 of the adjacent side plate, pins 17 and 18 being provided with heads or washers on the outer sides of the standards. Slots 9 extend from front to back in a rather flat curve, movement of the pins 17 forwardly in the slots advancing the axis of the holder forwardly. Pins 18 are mounted in line with each other, near the lower edges of the side plates 11 and the curvature of slots 10 in which they travel is so chosen as to cause a partial rotation of the holder about its axis during the movement of pins 17 in their slots 9. Slots 9 may be referred to as "supporting slots," and slots 10 as "cam-curved guiding slots," the function of the latter being to guide the pins 18 during the movement of pins 17, the slots 10 constituting in effect cams with which pins 18 cooperate. Each holder is provided with a finger-grip 19 constituting part of a front frame 20 secured to the side plates 11 of the unit, a name or designating card 21 being secured in each frame 20. Index or division sheets 22 may be mounted within the holder and adapted to separate the records 23. Each index sheet 22 may be provided with an index tab 24 at one edge, the tabs of the different index sheets being spaced from each other in the usual manner.

It will be evident that my invention provides a mounting for the holder such that a forward and downward pressure upon the hand-grip, or a forward pull upon the oscillatory structure itself, causes an advance of the holder into forward position and a partial rotation of the holder. The holder is shown in Fig. 2 in depressed position, in dotted lines, in which the identifying tabs on the index sheets are shown as projected forwardly out of the cabinet, a desired record being removable by an approximately hori-

zontal movement as the same is drawn forwardly by the thumb and finger above the front frame 20 of the holder. The amount of rotation and forward advance of each holder is, of course, limited by the length of travel of pins 18 and 17 in their slots 10 and 9 and the forward movement of the tray 4. It will be noted that the arrangement is such that each holder is in balance in each position. Forward and downward pressure upon the finger 19 also serves to draw tray 4 forwardly the length of its slots 6, the result of which is to place the holder in a forward depressed position in advance of that shown in dotted lines in Fig. 2, the dotted line position being that of the holder when the tray has not been advanced. The tray and standard 8 are also shown in this figure in dotted lines in their forward position, the corresponding position of the holder not being shown.

While I consider the construction involving the pins and slots described as the best adapted for my purpose, it is obvious that my invention includes equivalent means for causing the downward swinging of the front edge of the holder at the same time that the axis of the same is advanced. The division sheets 22 are preferably held in place by providing notches in the edges thereof, with which rods 14, 14 cooperate.

Having described my invention, what I claim as new therein and desire to secure by Letters Patent of the United States is:

1. In a filing device, the combination of a support, a tray slidably mounted thereon for a limited movement forward and back, a pair of standards mounted on said tray, and a holder pivotally mounted between said standards, comprising a pair of side plates and cross bars connecting said plates adjacent the edges thereof, each side plate having a pair of pins and each adjacent standard having a pair of slots comprising a supporting slot and a cam-curved guiding slot coacting with said pins so arranged that oscillation of said holder both rotates the same about a horizontal axis and advances its center of rotation between said standards, said holder having a hand grip for both oscillating said holder and advancing said tray, substantially as set forth.

2. In a record filing device, the combination of a pair of standards, and a holder mounted between the same, comprising a pair of side plates and cross-bars connecting said plates, including a front frame member secured to the upper portions of said side plates, in the normal position of the device, said plates having pivot pins at their normal centers of gravity and rotation and said standards having forwardly-directed tracks on which said pivot pins bear, said plates also having other pins extending therefrom and said standards having curved guiding

slots in which said last-named pins travel,
so arranged as to cause continuous and regular circular movement of said holder about
its axis as said pivot pins advance on their
5 tracks, said holder being adapted to rotate
through an arc of approximately 90° while
said pivot pins travel from one end to the
other of said tracks so that records may be
removed from the holder above said front

frame, in the depressed and forward position of the latter, by an approximately horizontal movement, substantially as set forth. 10

This specification signed and witnessed
this 22nd day of June, 1915.

GEORGE E. BENDER.

Witnesses:

JOSEPH TEAL,
H. H. MECHAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

COMBINED MOTION PICTURE APPARATUS AND PHONOGRAPH.

1,252,304 ----- D. O. Royster,
Patented Jan. 1, 1918.
Filed July 15, 1917.

D. O. ROYSTER.
 COMBINED MOTION PICTURE APPARATUS AND PHONOGRAPH.
 APPLICATION FILED JULY 15, 1912.

1,252,304.

Patented Jan. 1, 1918.
 5 SHEETS—SHEET 1.

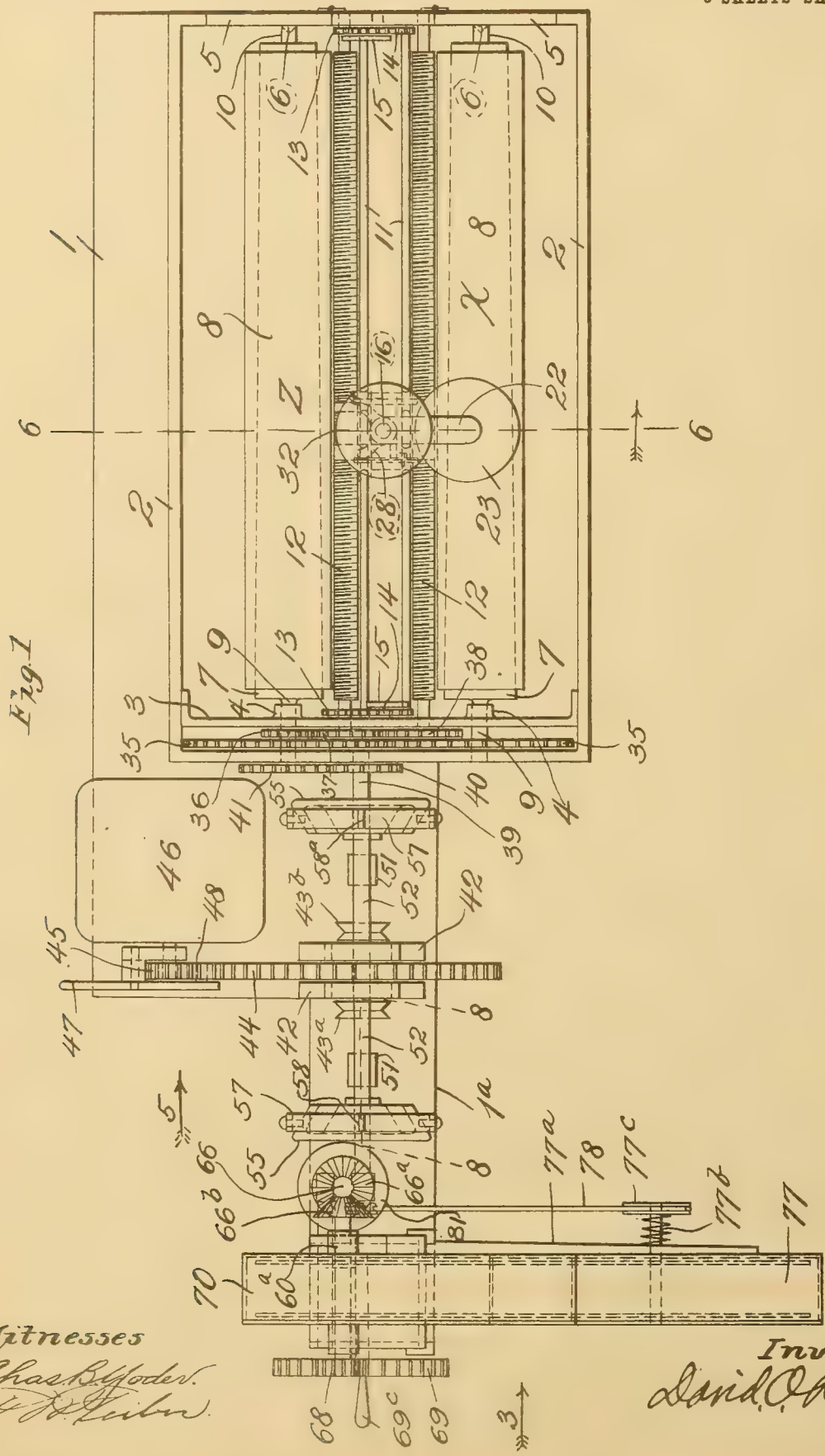


Fig. 1

Witnesses
 Chas. Rylander.
 J. D. Reiber.

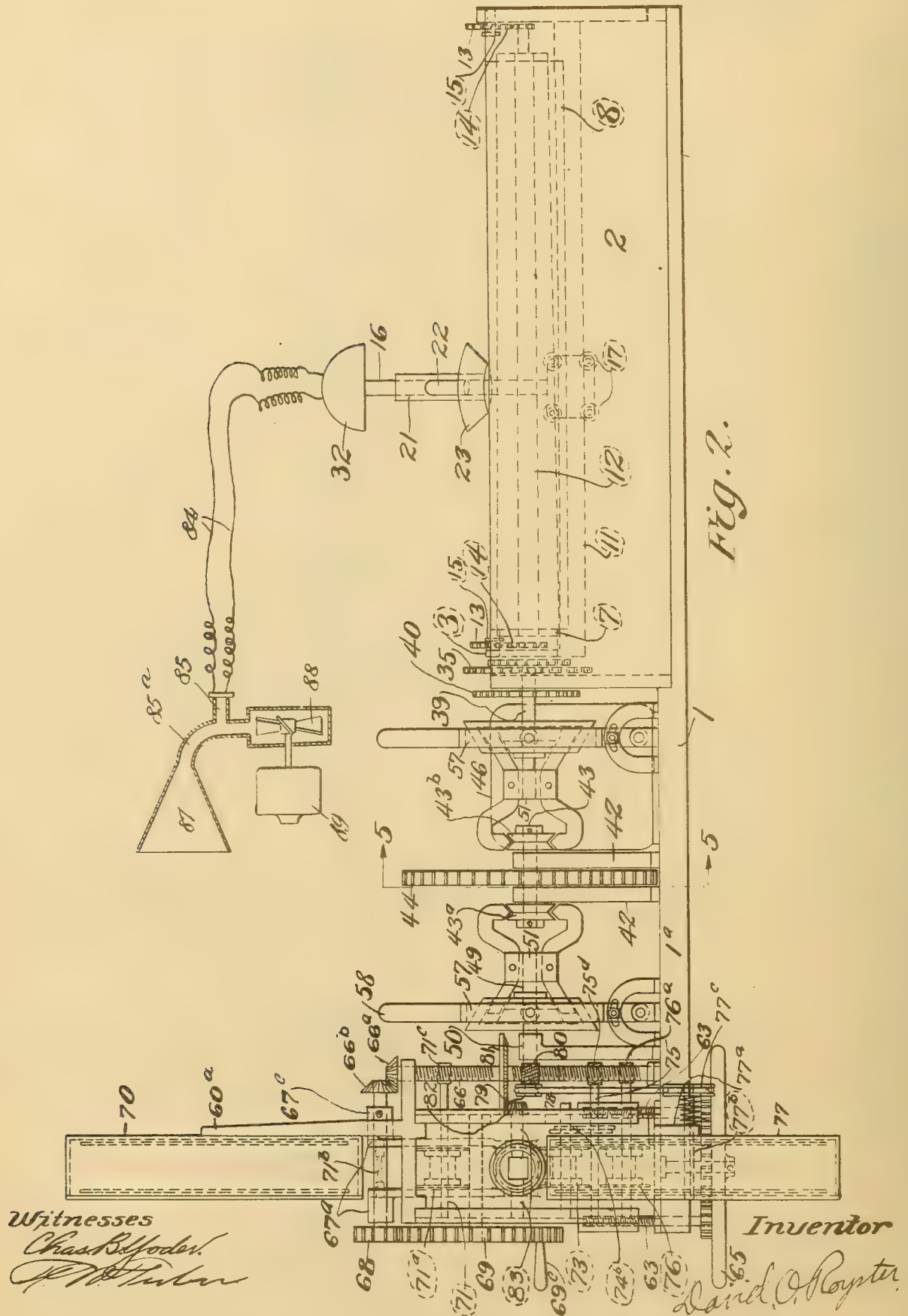
Inventor
 David O. Royster

D. O. ROYSTER.
 COMBINED MOTION PICTURE APPARATUS AND PHONOGRAPH.
 APPLICATION FILED JULY 15, 1912.

1,252,304.

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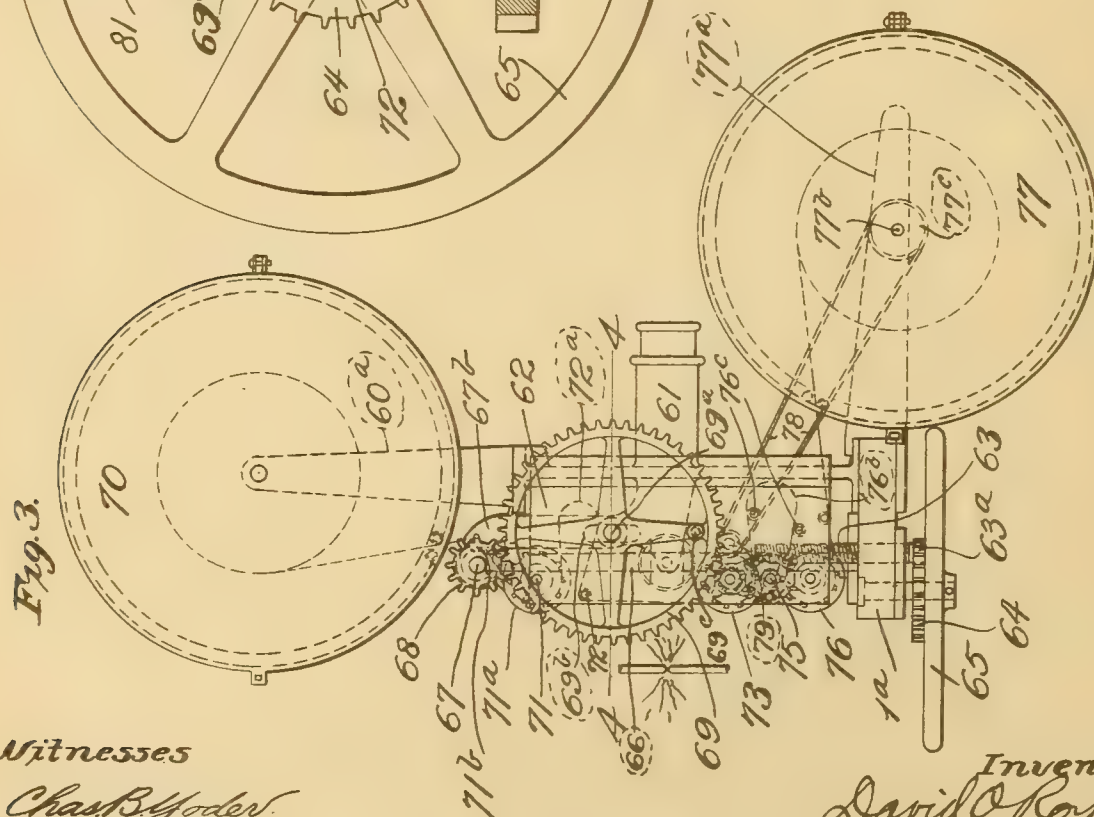
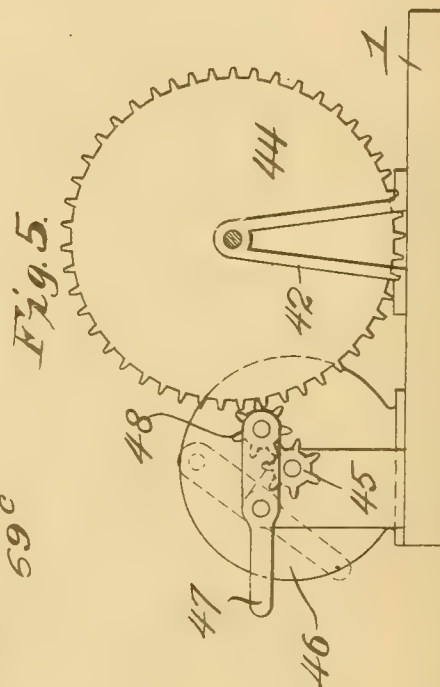
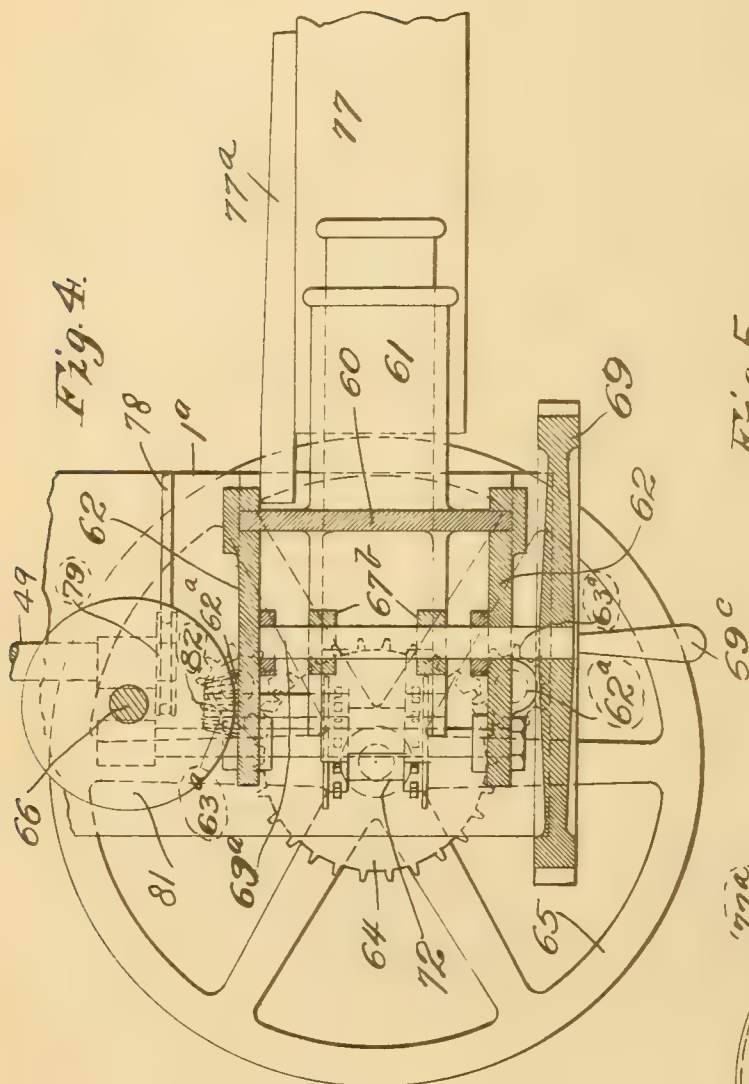
5 SHEETS—SHEET 2.



D. O. ROYSTER.
 COMBINED MOTION PICTURE APPARATUS AND PHONOGRAPH.
 APPLICATION FILED JULY 15, 1912.

1,252,304.

Patented Jan. 1, 1918.
 5 SHEETS—SHEET 3.



Witnesses

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 Ed. H. H. H.

Inventor
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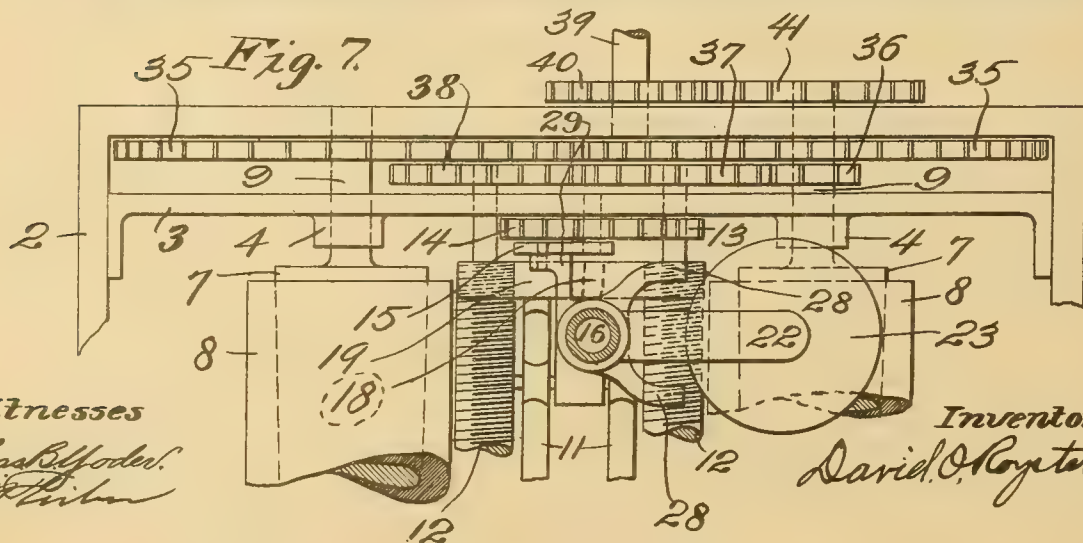
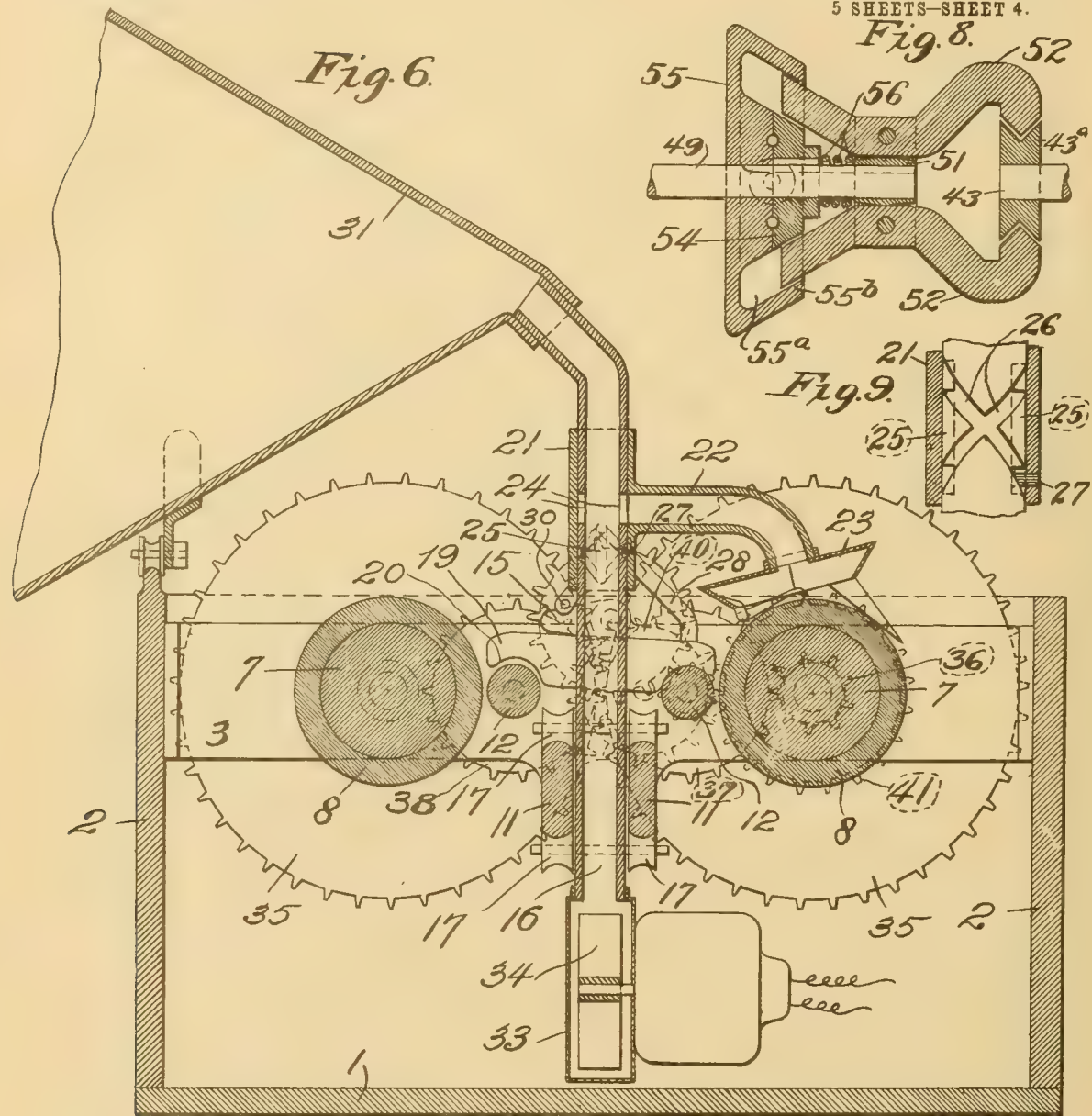
COMBINED MOTION PICTURE APPARATUS AND PHONOGRAPH.

APPLICATION FILED JULY 15, 1912.

1,252,304.

Patented Jan. 1, 1918.

5 SHEETS—SHEET 4.



Witnesses

Chas. B. Foder.
P. O. Editor

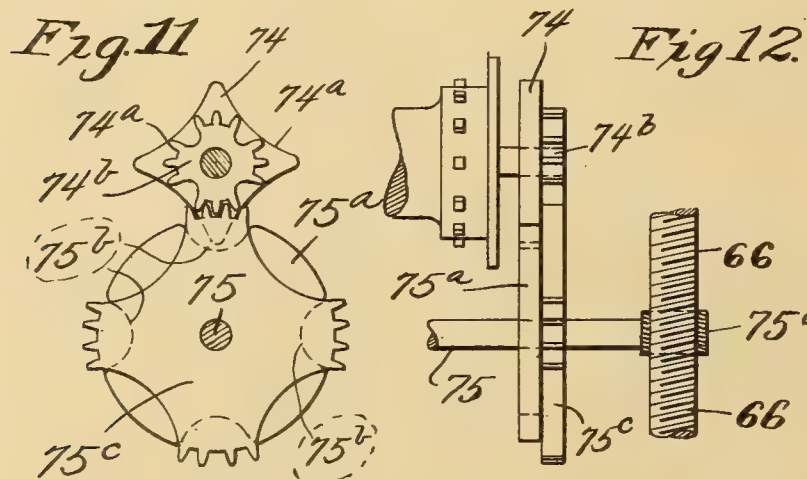
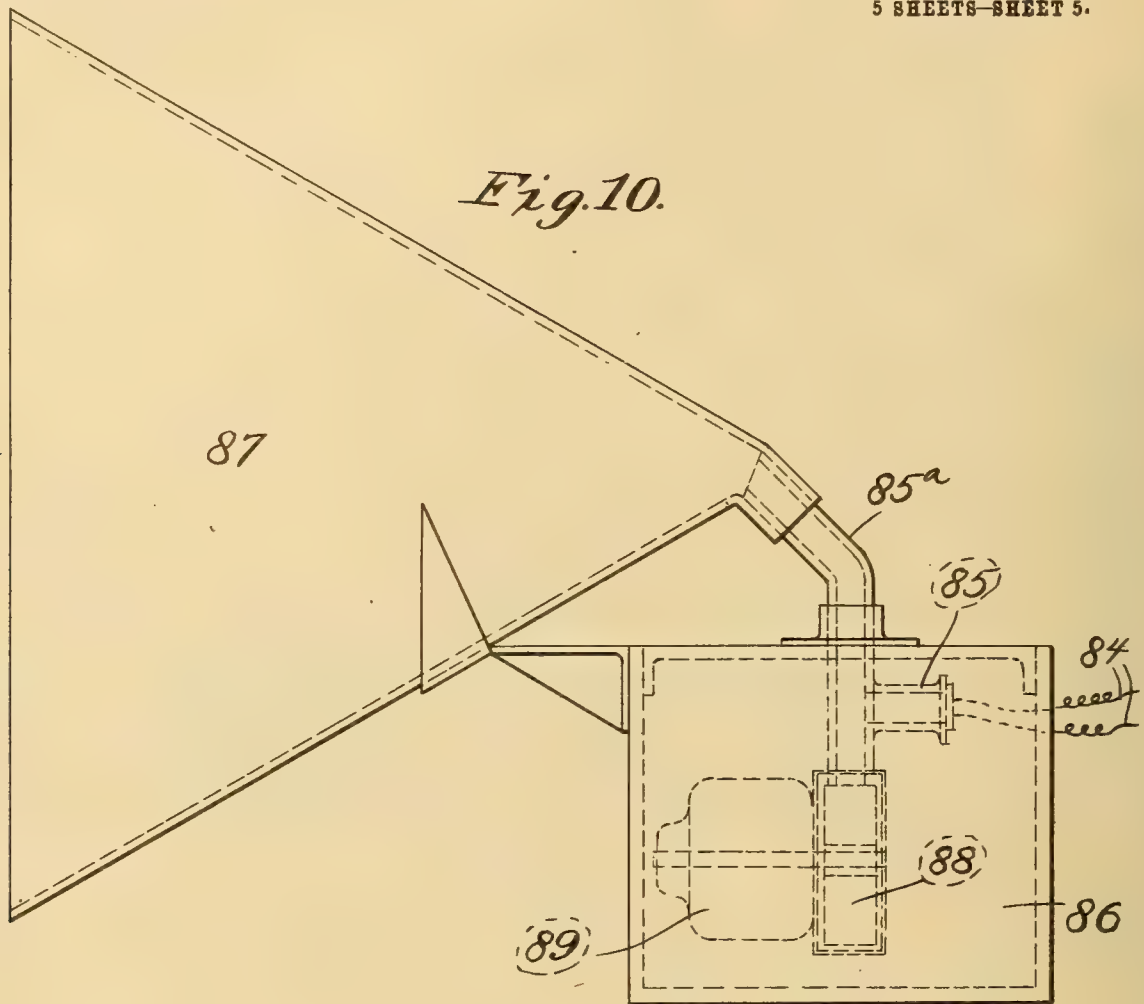
Inventor

David O. Royter

D. O. ROYSTER.
 COMBINED MOTION PICTURE APPARATUS AND PHONOGRAPH.
 APPLICATION FILED JULY 15, 1912.

1,252,304.

Patented Jan. 1, 1918.
 5 SHEETS—SHEET 5.



Witnesses

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Inventor

David O. Royster

UNITED STATES PATENT OFFICE.

DAVID O. ROYSTER, OF ST. LOUIS, MISSOURI.

COMBINED MOTION-PICTURE APPARATUS AND PHONOGRAPH.

1,252,304.

Specification of Letters Patent.

Patented Jan. 1, 1918.

Application filed July 15, 1912. Serial No. 709,399.

To all whom it may concern:

Be it known that I, DAVID O. ROYSTER, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Combined Motion-Picture Apparatus and Phonographs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a new and useful machine or apparatus for the simultaneous and synchronous display of motion pictures and reproduction of sounds, thereby making the motion pictures much more realistic than when displayed in the ordinary manner.

In the following description the term phonograph is used in its broadest sense, being intended to designate a suitable mechanism particularly adapted for reproducing sounds from a record.

The principal objects of my invention are, first, to provide a simple apparatus combining a phonograph and a motion picture machine which can be operated with comparatively little power, second, to provide simple means in the form of readily detachable clutches or connecting devices between the motor and the phonograph and picture machine, whereby the two machines can be simultaneously operated in synchronism, or independently, as desired, third, to provide means whereby the two machines can be operated singly or together, either by hand power or by a suitable motor, fourth, to provide means for effectually protecting the film used in the motion picture machine so as to reduce to a minimum the danger of fire, fifth, to provide simple means for protecting the film as it is transferred from one reel to the other, and preventing the body of said film from being scratched and its edges broken or cracked, sixth, to provide simple means for vertically adjusting the film and film carrying rollers with respect to the barrel in which the projecting lens is located, and, seventh, to provide means whereby the reproduced sounds can be carried or transmitted to a reproducing apparatus located to the rear of the screen upon which the pictures are thrown.

To the above purposes my invention consists in certain novel features of construction and arrangement of parts hereinafter more fully described, claimed and shown in the accompanying drawings, in which—

Figure 1 is a plan view of an apparatus of my improved construction.

Fig. 2 is a front elevation of the apparatus.

Fig. 3 is an elevation of the motion picture machine, said elevation being taken as looking in the direction indicated by the arrow 3 in Fig. 1.

Fig. 4 is an enlarged horizontal section taken approximately on the line 4—4 of Fig. 3.

Fig. 5 is an elevation of the parts seen looking in the direction indicated by the arrow 5, Fig. 1, and showing the connections from the motor to the main driving shaft of the apparatus.

Fig. 6 is an enlarged cross-section taken on the line 6—6 of Fig. 1.

Fig. 7 is an enlarged plan view of the end of the frame of the phonograph, showing the driving connections between the two record carrying shafts and the automatically reversing reproducer.

Fig. 8 is an enlarged vertical section taken approximately on the line 8—8 of Fig. 1.

Fig. 9 is a detail elevation of a portion of a tube that carries the sound reproducer, and showing the grooves therein which are instrumental in effecting a swinging or shifting movement of the reproducer.

Fig. 10 is an elevation of the amplifying horn utilized in connection with my approved apparatus when the reproduced sounds are transmitted to the rear side of the screen on which the pictures are shown.

Fig. 11 is an elevation of an intermittent gearing utilized for moving the film from one reel to another, and which gearing is instrumental in imparting the necessary intermittent movement to said film.

Fig. 12 is an elevation of the gearing, seen in Fig. 11, and also showing adjacent parts of the mechanism of the motion picture machine.

Referring by numerals to the accompanying drawings, 1 designates a bed or base-plate, and located thereon is a rectangular

frame 2 which forms a support for the phonograph and its operating mechanism. Located in the left hand of this frame is a transverse rail 3 provided with bearings 4.

5 The right hand end wall of the frame is provided with two hinged or removable sections 5, and formed on the inner faces thereof are conical bearing points 6 which are in alinement with the bearings 4. Cylindrical
10 members 7 are adapted to carry removable sound records 8, preferably in the form of wax cylinders, and projecting from the left hand ends of these members 7 are short shafts 9, which operate in the bearings 4 and
15 in corresponding bearings in the left hand end wall of the frame 2. Short pintles 10 project from the right hand ends of the members 7, said pintles being provided with recesses adapted to be engaged by the conical
20 bearing points 6.

When the removable sections 5 are detached or swung outwardly, the sound records 8 are free to be removed from the members 7. A pair of parallel longitudinally
25 extending rails 11 are located in the center of the frame 2, and arranged outside and immediately adjacent to these rails are longitudinally extending threaded shafts 12, the ends of which are journaled for rotation in
30 suitable bearings in the transverse rail 3 and in the right hand end wall of the frame 2.

Fixed on the ends of one of these shafts 12, are pinions 13, and meshing therewith are larger pinions 14, which latter are
35 mounted on studs seated in the bar 3 and right hand end wall of the frame 2, and each of said pinions carries an arm 15. A vertically disposed tube 16 is adapted to move lengthwise between the rails 11 and
40 carried by and arranged on opposite sides of this tube are pairs of rollers 17 that bear on the upper and lower edges of said rails. Projecting from this tube is a stud 18 on which is loosely mounted a dog 19 provided
45 in its ends with notches 20, the surfaces of which are provided with teeth adapted to engage the threads of the shafts 12. Loosely mounted on the tube 16 is a short tube 21 having a horizontal tubular extension 22
50 that carries a sound reproducing member 23 of any well known construction, the needle of which is adapted to engage the record cylinders 8. The tube 16 is provided with a pair of oppositely arranged apertures 24
55 with which the inner open end of the tubular extension 22 is adapted to engage.

Formed in the surface of the tube 16 is an oppositely arranged pair of vertical grooves 25 and connecting the ends thereof
60 are oppositely disposed pairs of spirally arranged grooves 26. Seated in the tube 21 is a pin 27 that engages in the grooves 25 and operates through the grooves 26 as the reproducer is shifted from one record to the
65 other. Fixed to and projecting outwardly

and downwardly from the tube 21 is a pair of arms 28, the ends of which are adapted to engage upon the ends of the dog 19, to hold the same in engagement with the shafts 12. As the tube 21 carrying the arms 28 is 70 reversed in position, each of said arms alternately engages the opposite ends of the dog to cause the toothed surfaces to alternately engage the threaded shafts.

Carried by the tube 21 on the side opposite 75 from the arms 28 is a laterally projecting bracket 29, provided with a pin 30, so positioned as to be engaged by the arms 15 carried by the pinions 14.

The upper end of the tube is bent slightly 80 and is adapted to receive an amplifying horn 31 or a suitable telephone transmitter 32. Carried by the lower end of the tube 16 is a housing 33 in which operates a small fan 34, driven by a motor attached to said housing 85 and receiving current from a suitable source. This fan is for the purpose of forcing the sound waves out of the tube 16, and into the horn or transmitter carried thereby.

Fixed on the shafts 9 adjacent to the right 90 hand end wall of the frame 2 are meshing gear wheels 35, and fixed on one of said shafts 9 is a small pinion 36, that meshes with a larger pinion 37, which latter is fixed on the end of the adjacent shaft 12 and 95 meshes with a corresponding pinion 38 fixed on the other one of said shafts 12. The pinion 37 is mounted on the same shaft 12 that carries the pinions 13. Journaled for rotation in the left hand end wall of the 100 frame 2 is one end of a shaft 39, carrying a pinion 40, and meshing therewith is a pinion 41 that is fixed on the end of the shaft 9 that carries the pinion 36.

Journaled in suitable bearings 42 to the 105 left of the shaft 39 is a short shaft 43 and fixed on the ends thereof are grooved pulleys 43^a and 43^b. This shaft carries a gear wheel 44, and arranged adjacent thereto and in alinement therewith is a pinion 45, that 110 is carried by the main shaft of a suitable motor 46. Journaled for rotation upon the end of a fulcrumed hand lever 47 is a pinion 48 that is adapted to form a driving connection between the pinion 45 and gear wheel 115 44. The shaft 43 is in direct alinement with the shaft 39 and arranged immediately to the left of said shaft 43 and in alinement therewith is a shaft 49 that is journaled in a suitable bearing 50. The shaft 43 is the 120 motor driven shaft and to impart rotary motion therefrom to the shafts 39 and 49 I employ a pair of clutches that are identical in construction and operation.

One of these clutches is illustrated in Fig. 125 8, its construction being as follows: Fixed on the end of the shaft 49 is a slotted collar 51, and pivotally carried thereby is an oppositely arranged pair of levers 52, the outer ends of which are formed to engage in the 130

grooved pulley 43^a. Arranged to slide lengthwise on a key or feather seated in the shaft 49 is a disk 54 having a beveled edge adapted to bear against the inner faces of the ends of the levers 52 opposite the ends that engage the pulley. Loosely mounted on the shaft 49 immediately to the rear of the disk 54 is a larger disk 55 provided with recesses 55^a that receive the ends of the levers 52. The edges 55^b at the outer ends of the recesses are adapted to bear against the outer faces of the ends of the levers. Ball bearings are located between the adjacent faces of the disks 54 and 55 and located on the shaft 49 between the collar 51 and the disk 54 is a compression spring 56 that tends to force the disk 54 away from between the ends of the levers 52. The disk 55 is inclosed by a yoke 57, the same being carried by a hand lever 58 which latter is pivoted on the base 1 and is provided with a suitable segment and locking pawl whereby it may be locked to hold the disk 54 between the ends of the levers 52. When thus held locked the grooved pulley is engaged by the outer ends of the levers 52, thereby locking the shafts 43 and 49 so that they will rotate simultaneously. The shaft 39 is equipped with a clutch identically like the one just described, and this last mentioned clutch is operated by means of a hand lever 58^a for locking the shafts 43 and 39 to each other so that they will rotate simultaneously.

Projecting from the left hand end of the base 1 is an extension 1^a on which the motion picture machine of my improved apparatus is mounted. This mechanism comprises an upright plate 60, the bottom of which is fixed to the base, and said plate carries the barrel 61 in which the projecting lenses are located. Arranged to slide vertically on the plate 60 is a vertically disposed frame work comprising a pair of side plates 62, which form supports for the various film carrying rollers.

Formed on the lower portions of these plates 62 are vertically disposed lugs 62^a, in which are seated the threaded upper ends of screw shafts 63, which latter are journaled in the base 1^a and carry on their lower ends pinions 63^a. These pinions mesh with a large gear wheel 64, carried by a hand wheel 65, which latter is journaled on a suitable stud depending from the base 1^a.

This mechanism provides means for raising or lowering the position of the film with respect to the projecting lenses in the barrel 61.

Positioned immediately to the left hand of the bearing 50 is a vertically disposed threaded shaft 66, and carried by the upper end thereof is a beveled pinion 66^a, which meshes with a corresponding pinion 66^b, carried by the end of a shaft 67. This shaft is

journaled in suitable bearings 67^a, on the upper ends of brackets 67^b, which latter project upward from the barrel 61.

A collar 67^c is adjustably arranged on the shaft 67 by means of a set screw and when said set screw is loosened to release the collar, the shaft 67 can be shifted toward the left to disengage the pinion 66^b from the pinion 66^a. Fixed on the left hand end of the shaft 67 is a pinion 68, that is adapted to mesh with a gear wheel 69, carried on the end of a shaft 69^a, which latter passes through slots 69^b in the plates 62 and operates in bearings formed in the brackets 67^b. The gear wheel 69 is provided with an operating handle 69^c which is manually engaged when the motion picture machine is to be operated by hand.

Fixed to the upper end of the plate 60 is a bracket 60^a, and positioned thereon is a reel housing 70 that is adapted to receive the reel of film that is to be passed through the motion picture machine.

Journaled for rotation in suitable bearings in the upper ends of the plates 62 is a film carrying roller 71 provided with the usual projections near its ends, which projections enter the usual apertures formed in the sides of the film—and located on the ends of this roller are comparatively wide flanges 71^a which serve as a protection for the edges of the film to prevent the same from being scratched or broken. Located immediately above this roller is a small roller 71^b which serves to guide the film onto said roller 71. One end of the shaft that carries the roller 71 is extended and carries a worm 71^c that meshes with the shaft 66.

Located below the roller 71 is a small roller 72 and the film is extended laterally to form a free loop, as designated by 72^a between the rollers 71 and 72. From the roller 72 the film passes downward behind the rear end of the barrel 61 onto a second film supporting roller 73 provided with projections and end flanges in every way similar to those on the roller 71, and said roller 73 is mounted for rotation in suitable bearings in the plates 62. Fixed on the shaft of this roller 73 is a disk 74 having a series of concave notches 74^a in its edge and said disk carries a mutilated pinion 74^b.

Journaled in the plates 62 below the roller 73 is a shaft 75 carrying a disk 75^a provided in its edge with notches 75^b, and the portions of this disk between said notches are adapted to bear against the surfaces of the notches 74^a in the disk 74.

Carried by the disk 75 is a mutilated gear wheel 75^c, the teeth of which engage with the teeth of the mutilated pinion 74^b. Fixed on the end of the shaft 75 is a worm 75^d that meshes with the shaft 66.

The arrangement just described provides means for imparting intermittent movement

to the film. Arranged for rotation below the shaft 75 is a third film carrying roller 76 provided with projections and end flanges, in every way similar to those on the rollers 71 and 73. Fixed on the shaft that carries this roller 76 is a worm 76^a that meshes with the shaft 66. The film is extended laterally to form a loose loop 76^b between the rollers 73 and 76, which loop is supported at suitable points by small rollers 76^c.

From the roller 76 the film passes into a reel housing 77 that is carried by a suitable bracket 77^a projecting from the base 1^a. Arranged within this housing is a shaft 77^b adapted to receive the reel onto which the film is to be wound after passing through the machine, and fixed on said shaft is an ordinary slip pulley 77^c which receives a belt 78, which latter operates on a pulley 79 carried by the left hand end of the shaft 49. Fixed on this shaft 49 adjacent to the pulley 79 is a worm 80 that meshes with the screw threaded shaft 66.

Fixed on the shaft 66 near its center is a beveled gear wheel 81 that meshes with a pinion 82 carried by the end of a shaft 83, which latter is mounted in suitable bearings in the plates 62 and extends through the rear end of the barrel and carries a suitable shutter (not shown).

In order to telephone or transmit the sounds produced from the records 8 to a point back of the screen on which the pictures are shown, ordinary telephone conducting wires 84 lead from the transmitter 32 to a telephone receiver 85 located in a box or housing 86 positioned behind the screen and leading from this receiver is a tube 85^a to which is connected an amplifying horn 87.

Located at the lower end of the tube 85^a is a fan 88. This fan operates within a suitable housing and is driven by a small motor 89 that is mounted on said housing. Thus means are provided for driving all the sound waves from the receiver 85 through the tube 85^a and into the horn 85.

The operation of my improved apparatus is as follows: Assuming that it is desired to drive the motion picture machine and phonograph synchronously and from the motor 46, the hand levers 58 are shifted toward each other to move the members 55 and disks 54 upon their respective shafts, thereby engaging the rear ends of the pairs of levers 42, rocking the same upon their pivot points and clamping their forward ends upon the pulleys 43^a and 43^b. Thus the levers perform the function of clutches and lock the shafts 39 and 49 to the shaft 43. This shaft is driven from the motor 46 by the train of gearing 45, 48 and 44.

The rotary motion of the shaft 39 is transmitted to the shafts 9 by the pinions 40 and 41, and pair of meshing gear wheels 35.

Rotary motion from one of the shafts 9 is transmitted to the threaded shafts 12 by means of the meshing pinions 36, 37, and 38. The pinions 14 carrying the arms 15 are driven from one of the shafts 12 by the pinions 13.

The reproducer 23 is started at the left hand end of the record cylinder marked X in Fig. 1, and when so positioned one of the arms 28 engages on top of the corresponding end of the dog 19, thereby causing the toothed notch in this end to engage the threaded shaft 12 that is immediately adjacent to the cylinder X.

As this shaft rotates, the dog 19 and parts connected thereto are slowly moved lengthwise of the frame 2 by reason of the engagement of the dog with the threaded shaft. During such movement the tube 16 moves between the rails 11 with the rollers 17 riding thereon. The needle of the transmitter 23 follows the indentations in the surface of the record cylinder and the reproduced sounds pass into the tube 16 and pass therefrom into and through the horn under the influence of the fan 33.

When the moving parts comprising the reproducer 23, tube 16, dog 19 reach the right hand end of the record cylinder X, said parts are automatically shifted, so as to position the reproducer on the other one of the record cylinders and the dog is caused to engage with the opposite shaft 12, in the following manner:

As the reproducer 23 reaches the right hand end of the record cylinder X the right hand of the pin 30 moves into the path of travel of the arm 15 carried by the right hand one of the pinions 14. This arm engages against the underside of said pin and as the pinion 14 continues to rotate, said arm exerts a lifting pressure against the engaged pin. As a result the sleeve 21 and parts carried thereby are elevated, during which time the pin 27 travels through one of the vertical slots 25. During this movement the sleeve 21 cannot rotate but when the pin 27 reaches the upper end of the vertical slot the continued movement of the arm 15 bearing against the pin 30 tends to rotate the sleeve 21 and the pin 27 now passes into one of the curved grooves 26 and by gravity the reproducer 23 will swing around and downwardly to a position directly opposite the one in which it has been positioned, and thus the needle of said reproducer is brought into contact with the surface of the record cylinder Z at the right hand end thereof. During the downward swinging movement of the reproducer the pin 27 passes through one of the curved grooves 26. As the position of the reproducer is thus changed, one of the arms 28 leaves the end of the dog 19, and the opposite arm engages on the opposite end of said dog thus bring-

ing the corresponding notched end into engagement with the threaded shaft 12 that is adjacent to the cylinder Z, and as said shaft continues to rotate the dog, together with
 5 the tube 16 and parts carried thereby are moved toward the left hand end of the machine.

While the reproducer is operating on the cylinder X, a record cylinder can be placed
 10 on the opposite cylinder Z and while said reproducer is traveling on the cylinder Z the cylinder X can be removed and replaced by a different record cylinder. When the reproducer reaches the left hand end of the cylinder Z, the pin 30 (which was shifted in position when the reproducer and carried parts were swung around) is engaged by the corresponding arm 15 and as a result the sleeve 21 and carried parts are elevated as herein-
 15 before described, and the reproducer is swung around onto the left hand of the record cylinder, which has been substituted for the cylinder X.

During the operation of the phonograph, as just described, the motion picture machine is synchronously operating as follows: The rotary motion of the motor shaft 43 is imparted to the shaft 49 by means of the intermediate clutch, and the worm 80 engaging
 25 the screw shaft 66 drives the same. The film carrying rollers 71 and 76 are simultaneously rotated by reason of the engagement of the worms 71^c and 76^a with the screw shaft 66.

The shaft 77^b carrying the reel onto which the film is rolled is driven by the belt 78 operating on the pulleys 79 and 77^c. The latter is an ordinary form of slip pulley and compensates for the gradually increasing size of the roll of film onto the reel carried by the shaft 77^b. The apertures of the film receive the projections on the rollers 71 and 76 and thus said film is gradually unwound from one reel and wound onto the
 35 other. The horizontally disposed loops 72^a and 76^b form sufficient lengths of film to permit the intermittent movement of the film as it passes between the light and the shutter in the rear end of the lens barrel 61. The intermittent movement for the film is brought about by the mechanism shown in Figs. 11 and 12 and operates as follows:

The worm 75^a engages with the shaft 66 and thus the shaft 75 is constantly driven.
 40 The teeth of the mutilated gear wheel 75^c mesh with the corresponding teeth of the mutilated pinion 74^b, thereby intermittently driving said pinion, and during the time the teeth of these parts are not engaged, the periphery of the disk 75^a engages the surfaces of the concave notches 74^a of the disk 74, and during this latter engagement there is no movement imparted to the shaft on which the pinion 74^b is mounted. During
 45 the time the teeth of gear wheel 75^c are

in engagement with the teeth of the pinion 74^b, the points on the disk 74 between the notches 74^a enter the notches 75^b in the disk 75. Thus intermittent movement is imparted to the film carrying roller 73, and the film
 50 carried thereby is intermittently moved behind the shutter in the rear end of the lens barrel 61. It will be noted that this intermittent movement takes place between the horizontal loops 72^a and 76^b of the film. The
 55 shutter is operated from the beveled gear wheel 81 which meshes with the pinion 82.

When it is desired to adjust the film and film carrying rollers vertically with respect to the lens barrel and shutter, the hand
 60 wheel 65 is rotated, thereby rotating the screw rods 62^a by reason of the engagement of the gear wheel 64 with the pinions 63^a, and as a result the plates 62 and carried parts are raised or lowered.

Thus the phonograph and motion picture machine are operated synchronously, and as the pictures appear in succession on the screen the proper sounds are produced by
 65 the phonograph.

When it is desired to cut out the motor, the hand lever 47 carrying the pinion 48 is actuated to disengage said pinion from the pinion 45 and gear wheel 44. When this is done the apparatus can be manually operated by locating the collar 67^c on the shaft 67 so that the pinion 66^b meshes with the pinion 66^a and actuating the gear wheel 69 by manually engaging the handle 69^c.

By actuating the proper one of the hand
 70 levers 58 to release or unlock the corresponding clutch, either the phonograph or motion picture machine may be cut out, or rendered inoperative so that said machines can be operated independently when desired.

When it is desired to transmit the reproduced sounds to a point behind the screen on which the pictures are shown—the parts shown in Fig. 10 are located behind the screen and the wires 84 are led to the receiver 85. From this receiver the produced sound waves pass upward through the tube 85^a through the horn 87, and are thereby thrown directly against the screen on which the pictures are displayed.

The main portions of the film are maintained in the film housings, thereby materially reducing the danger of fire, and the wide flanges on the ends of the film carrying rollers, protect the edges of the film as it
 75 passes through the motion picture machine to the rear of the lens barrel.

It will be understood that an apparatus of my improved construction can be utilized for the synchronous production of a film and sound records, and where the apparatus is so used the motion picture machine and phonograph are simultaneously operated with a photographic lens in the lens barrel instead of a projecting lens, and with blank
 80

record cylinders on the members 7, and with a recording device in the place of the reproducer 23. Thus the same apparatus can be used for taking pictures and making sound records, which pictures and sound records are afterward placed in the apparatus and displayed and reproduced.

An apparatus of my improved construction is comparatively simple, can be operated with little power, can be easily adjusted, and provides simple means whereby a motion picture machine can be operated synchronously with a phonograph.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved apparatus can be made and substituted for those herein shown and described without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim—

1. In an apparatus for producing synchronism between motion pictures and a sound record, a motion picture machine, a phonograph having a pair of rotatably mounted cylinders arranged side by side, means for operating the motion picture machine and the phonograph simultaneously or independently, a tubular member mounted to move lengthwise between the phonograph cylinders, a reproducer connected to said tube, means for shifting said reproducer from one cylinder to the other when the tube reaches the ends of the cylinders, means for forcing sound waves through the tubular member, a telephone transmitter operatively connected to the tubular member, a horn located adjacent to the screen on which the motion pictures are shown, a telephone receiver connected to said horn, electrical connections between the telephone transmitter and the receiver, and means for forcing the sound waves from the receiver through the horn.

2. In an apparatus of the class described, the combination with a motion picture machine, of a phonograph including a pair of sound records arranged side by side, a vertically disposed tube adapted to travel between said sound records, a reproducer attached to said tube and adapted to contact with the surfaces of the cylinders, means for shifting the reproducer from one cylinder to another when the tube has moved to the ends of the cylinders, means carried by the tube for forcing sound waves from the reproducer through said tubular member,

and means for operating the motion picture machine and phonograph simultaneously or independently.

3. In an apparatus of the class described, the combination with a motion picture machine, of a phonograph including a pair of sound records arranged side by side, a vertically disposed tube adapted to travel between said sound records, a reproducer attached to said tube and adapted to contact with the surfaces of the cylinders, means for shifting the reproducer from one cylinder to another when the tube has moved to the ends of the cylinders, means carried by the tube for forcing sound waves from the reproducer through said tubular member, a telephone transmitter connected to the tube, an electric circuit in which said transmitter is located, a telephone receiver located in said circuit, and means for operating the motion picture machine and phonograph simultaneously or independently.

4. In an apparatus of the class described, a phonograph including a pair of record cylinders arranged side by side, a tube arranged between said cylinders, means for moving said tube from one end of the cylinders to the other, a sound reproducer connected to said tube and adapted to contact with the surfaces of the cylinders, means carried by said tube for forcing sound waves from the reproducer through said tube, and means for shifting the reproducer from one cylinder to the other at the ends of said cylinders.

5. In an apparatus of the class described, a phonograph including a pair of record cylinders arranged side by side, a tube arranged between said cylinders, means for moving said tube from one end of the cylinders to the other, a sound reproducer connected to said tube and adapted to contact with the surfaces of the cylinders, means carried by said tube for forcing sound waves from the reproducer through said tube, means for shifting the reproducer from one cylinder to the other at the ends of said cylinders, and means for electrically transmitting the reproduced sounds from the tube to a point remote from the phonograph.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this eighth day of July, 1912.

DAVID O. ROYSTER.

Witnesses:

CHAS. B. YODER,
RUTH PETERSON.

PHONOGRAPH.

1,352,411 ----- J. H. Dickinson,
Patented Jan. 8, 1916,
Filed Mar. 28, 1916.

1,252,411.

Patented Jan. 8, 1918.

Fig. 1.

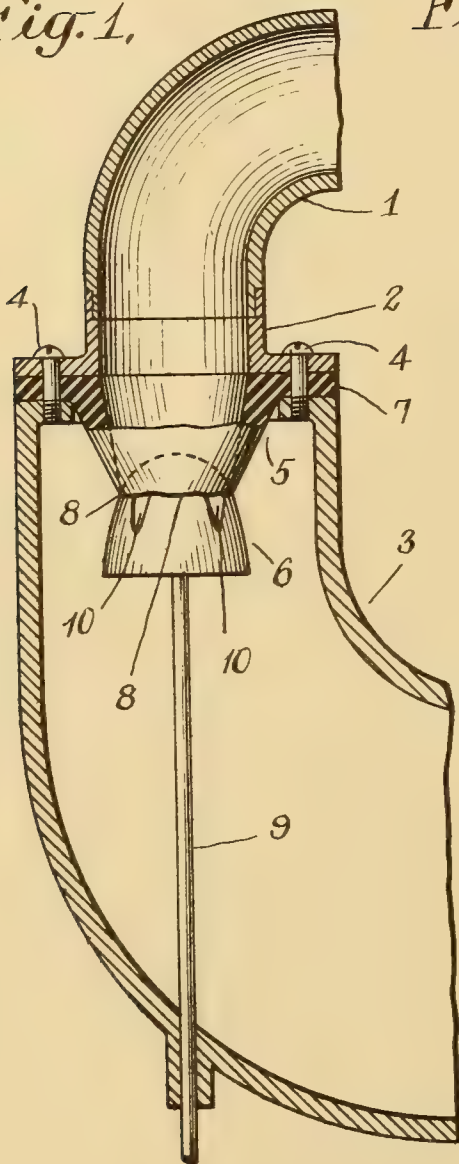


Fig. 2.

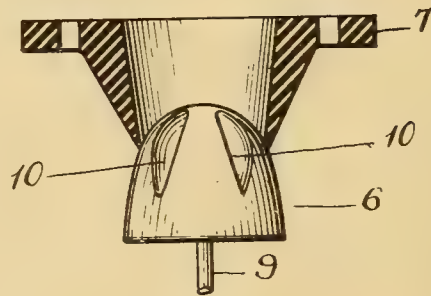


Fig. 3.

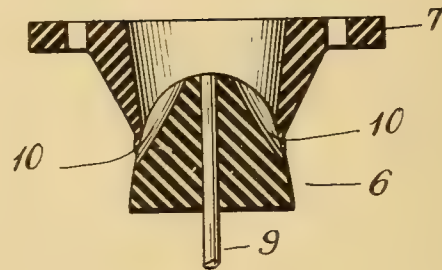


Fig. 4.

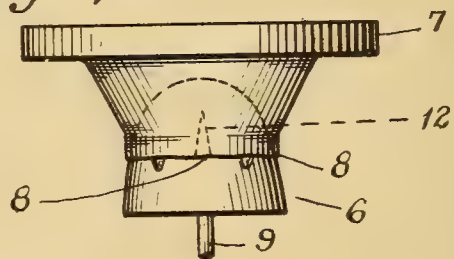


Fig. 5.

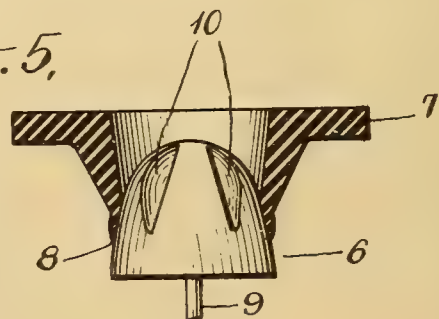
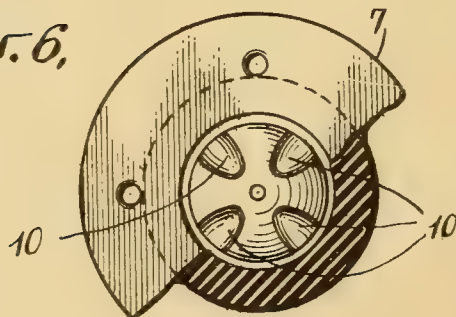


Fig. 6.



INVENTOR
Joseph Hunter Dickinson
 BY
E. W. Scherr ATTORNEY

UNITED STATES PATENT OFFICE.

JOSEPH HUNTER DICKINSON, OF CRANFORD, NEW JERSEY, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

PHONOGRAPH.

1,252,411.

Specification of Letters Patent.

Patented Jan. 8, 1918.

Application filed March 28, 1916. Serial No. 87,231.

To all whom it may concern:

Be it known that I, JOSEPH HUNTER DICKINSON, a citizen of the United States, residing at Cranford, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

My present invention relates to improvements in phonographs and particularly to an improved expression device therefor, the features and advantages of which will be apparent to those skilled in the art from an understanding of the following description in connection with the drawings.

In the latter, Figure 1 is a partial vertical sectional view through a phonograph tone arm and horn equipped with an expression device embodying my present improvement; Figs. 2, 3 and 5 show the valve of the expression device telescoped to increasing extents into the throat; Fig. 4 is the same as Fig. 3 except that the parts are shown in elevation instead of vertical section; and Fig. 6 is a top plan view looking down upon the throat and valve, a portion of the throat being shown cut away.

I will now describe the specific devices of the drawings:—1 is the tone-arm of the phonograph, swiveling on the sleeve 2 secured to the neck of the horn 3 by the screws 4. The phonograph is supposed, of course, to have the other well-known operative parts belonging thereto, such as a reproducer on the tone-arm etc. The expression device comprises a throat 5 and a plug valve 6 adapted to telescope therewith. Both throat and valve are preferably made of soft rubber. The throat should be expansible and contractible under the telescoping action of the valve therewith. The valve need not be made of any such material but may be made of hard or rigid material. The throat preferably has a basal flange 7 adapted to be clamped between the sleeve 2 and the horn 3 with the throat extending into the neck of said horn. The wall of the throat preferably tapers in thickness to a thin edge or lip 8 at the mouth of the throat, which edge or lip should also be irregular as indicated in Figs. 1 and 4, as distinguished from being true and even; or the lip might be notched as indicated by the dotted lines 12 in Fig. 4, said notches to occur at intervals around the throat.

The active face of the plug valve is convex and said valve is mounted on a stem which is adapted to be reciprocated by the operator to vary the volume of tone delivered by the tone-arm to the horn. Thus the plug valve can be drawn wholly away from the mouth of the throat which is its loudest playing position; or may be forced up into a position as in Fig. 5 or somewhat beyond, which is its softest playing position, or may be caused to occupy any intermediate position to produce a correspondingly intermediate effect.

When in operating the valve in closing direction, it reaches the position shown in Fig. 2 wherein it just closes the mouth of the throat, there would be a tendency for a noticeably abrupt falling off in the tone to occur, were it not for my present improvements. One of these I have already described as residing in the irregularly edged lip to the throat. This prevents an abrupt closure and consequent abrupt falling off in the tone because the first contact between the valve and the throat is merely at spaced apart points around the mouth, and through these spaces the tone still continues to pass in diminished volume.

As additional means to this same end I provide recesses 10 in the surface of the valve adapted to be gradually closed by the walls of the throat (compare Figs. 2, 3 and 5) in telescoping of the valve into the throat and vice versa to be increasingly opened as the valve is withdrawn. Because these recesses extend below the mouth of the throat when the valve is just touching said mouth, they permit the tone to pass in properly diminished quantity, instead of being noticeably or abruptly cut down as it would be without said recesses. It is further to be noted that the recesses become shallower and narrower as they extend toward the base of the valve which results in the openings for the described passage of the sound becoming gradually smaller as the valve is telescoped into the throat, until said openings are finally fully covered by the throat and the tone is reduced to a minimum.

In short my improvements lead to a non-abrupt diminution or vice versa increase of tone as the valve is respectively telescoped or withdrawn from the throat. The importance of this will be appreciated since upon it depends the artistic quality of the

musical effects obtainable from the manipulation of the valve.

What I claim is:—

5 1. In combination, a sound-passage, and a telescoping plug valve and throat controlling said passage, the first contact between said valve and throat being only partial with intermediate spaces.

10 2. In combination, a sound-passage, and a telescoping plug valve and throat controlling said passage, the first contact between said valve and throat being only partial with intermediate spaces such that they are gradually closed as the valve and throat
15 are telescoped on each other.

3. In combination, a sound-passage, and a telescoping valve and an elastic throat controlling said passage, the first contact
20 between said valve and throat being on an irregular edge.

4. In combination, a sound-passage, and a telescoping plug valve and an elastic throat controlling said passage, the surface of said valve being recessed to permit the sound to
25 pass when the valve is just contacting with the mouth of the throat.

5. In combination, a sound-passage, and a telescoping plug valve and an elastic throat controlling said passage, the surface of said
30 valve being recessed to permit the sound to pass when the valve is just contacting with the mouth of the throat and to continue to pass to a diminishing extent as the valve is telescoped into the throat and to
35 be closed by the sides of said throat when the valve is fully telescoped therein.

In testimony whereof, I have signed my name to this specification this 27th day of March, 1916.

JOSEPH HUNTER DICKINSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

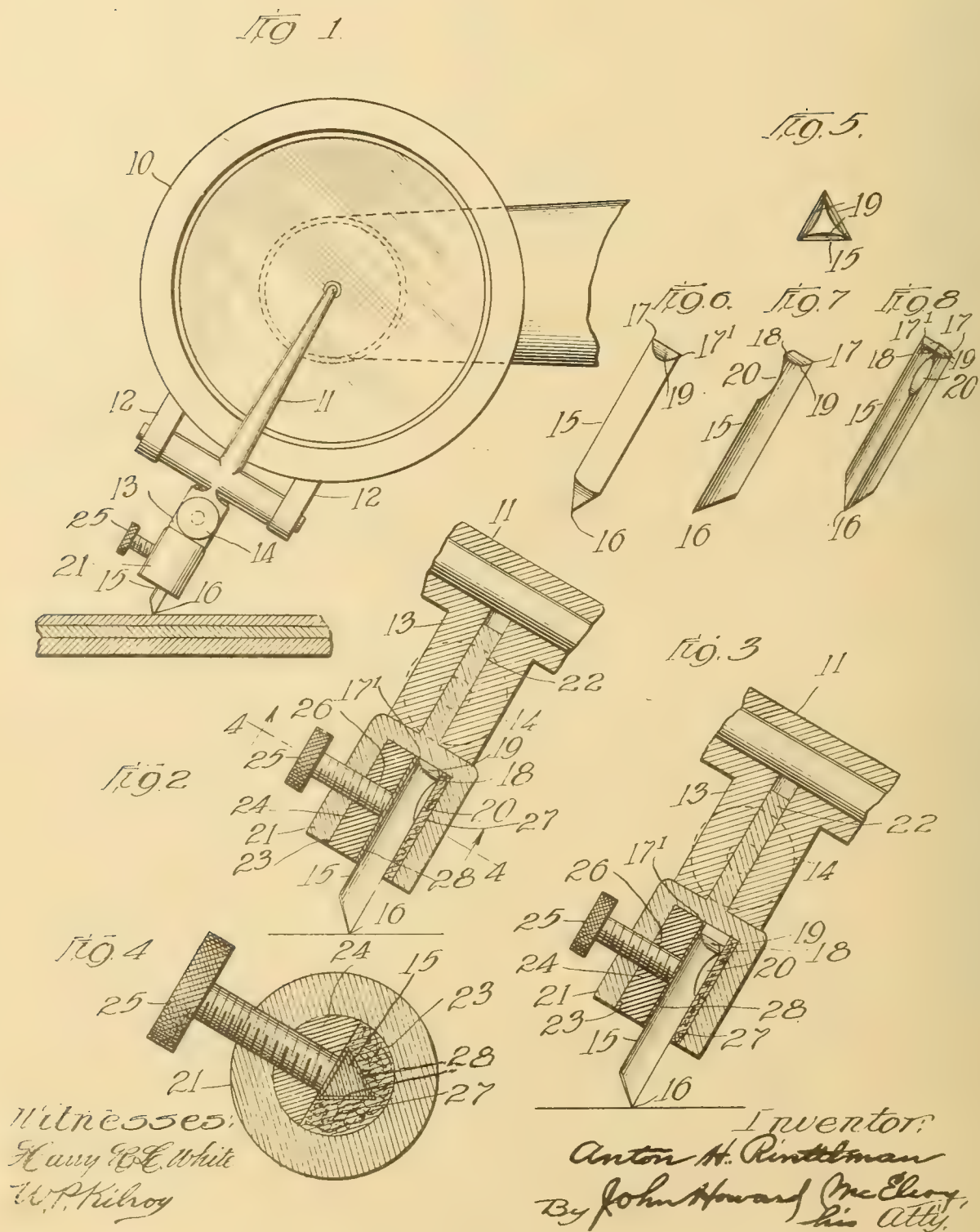
SOUND REPRODUCING MACHINE.

1,252,843 ----- A. H. Rintelman,
Patented Jan. 8, 1918,
Filed Mar. 14, 1917.

A. H. RINTELMAN.
SOUND REPRODUCING MACHINE.
APPLICATION FILED MAR. 14, 1917.

1,252,843.

Patented Jan. 8, 1918.



Witnesses:
Harry E. White
W. P. Kilroy

Inventor:
Anton H. Rintelman
By John Howard McElroy,
his Atty.

UNITED STATES PATENT OFFICE.

ANTON H. RINTELMAN, OF CHICAGO, ILLINOIS.

SOUND-REPRODUCING MACHINE.

1,252,843.

Specification of Letters Patent.

Patented Jan. 8, 1918.

Application filed March 14, 1917. Serial No. 154,656.

To all whom it may concern:

Be it known that I, ANTON H. RINTELMAN, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sound-Reproducing Machines, of which the following is a full, clear, and exact specification.

My invention is concerned with the styli and their supporting mechanism used in sound-reproducing machines, and is designed to produce such styli and so support them as to produce the very best possible reproduction of the tones recorded and to enable me to vary the loudness of said tones at will.

To this end, I have devised a novel needle or stylus, preferably with a plurality of points to adapt it for the different types of this record, such as the zigzag Columbia and Victor records, and the hill-and-dale Edison and Pathé records, together with a holder therefor, which enables me not only easily to position the needle perfectly relative to the groove in the disk, but also to regulate within a very wide degree the loudness of the tone produced by the single needle, without impairing the quality thereof.

To illustrate my invention, I annex hereto a sheet of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Figure 1 is a side elevation of a sound-box and a part of a tone arm having my invention applied thereto;

Fig. 2 is a central longitudinal section, on an enlarged scale, through the needle-holder in a plane parallel to the face of the diaphragm;

Fig. 3 is a similar view, but with the needle adjusted for a lighter tone;

Fig. 4 is a cross section, on a still larger scale, on the line 4—4 of Fig. 2;

Fig. 5 is an end view of the needle detached, on the same scale as it appears in Fig. 4; and

Figs. 6, 7 and 8 are side elevations of the needle as seen from three different sides.

In carrying out my invention, I employ any customary sound-box 10 provided with the customary needle-bar 11, suitably journaled, as in the bearings 12 carried by the sound-box, and having the customary needle-socket 13 with the customary set-screw 14.

Of course these can be varied for the different make of machine which is employed.

The needle 15 is made of a bar of some crystalline homogeneous mineral which has the proper hardness for the purpose. The bar is preferably of substantially uniform dimensions throughout its length, and is likewise preferably in the form of a regular polygon in cross section, said cross section preferably being an equilateral triangle, and it is preferably small enough so that it will fit in the socket of an ordinary needle-holder in the same manner as the well-known triangular fiber needles, in case the user desires to procure the greatest possible loudness of tone from the use of the needle, in which case it will be placed directly in the socket 13 and secured in the same manner as the ordinary fiber needle. For such use, it is preferably provided on one end with the point 16 formed by beveling off that end. On the other end, I preferably form two points 17 and 17', which may be just alike, and a third point or ball 18, which is preferably adapted for a Pathé record, as will be hereinafter described. To produce these points, I grind out the concavities 19 in the sides of the needle at that end, and as the concavities increase in depth from the point where they begin on the sides of the needle to the end thereof, their grinding produces the two points 17 and 17', which have a much finer angle than the sixty degrees which would result if the end were cut or ground off flat without these concavities. For the Pathéphone point or ball 18, I round off the point produced by the adjacent concavities 19, and below the point, I grind out a recess 20, which enables the needle to stand at the proper angle on a Pathé record, and still make proper contact at all points thereon.

To control more perfectly the setting of the needle, as well as the loudness and quality of the tone, I employ in connection therewith the auxiliary holder 21, which preferably takes the form of a cylindrical cup having the stem 22 extending longitudinally from the center of the closed end and adapted to enter the socket of the needle-holder and be secured therein by the set-screw 14 in the same manner that a needle is secured in said socket. The upper half of the cylindrical aperture 23 in the socket is filled by a block of soft rubber 24 which is

properly shaped to fill substantially one-half of the socket, and which for the triangular needle shown is preferably substantially semi-circular in cross section. The flat surface furnishes a bearing for one side of the needle, and I preferably employ a set-screw 25 for the auxiliary holder, which is threaded through a suitable aperture in the side, and the end of which passes through a suitable aperture 26 in the rubber so that the end of the screw can engage one of the sides of the needle or stylus 15. A function of this rubber top is to make it resilient in case of an accident, such as dropping the tone arm on the record, thereby saving the needle, as well as the record, from injury.

The lower half of the socket is filled by a pad 27, which is preferably of fiber cloth made of raw hemp or flax and interwoven with wool. This pad is of the proper shape on the side adjacent to the rubber block 24 so as to form a socket of the proper shape to receive the body of the needle without any further compression of the pad. To keep the aperture or socket for the needle in proper shape to correspond with its cross section whether the needle is pushed partly in or all the way in, I line preferably all three sides of the socket with strips 28 of bamboo fiber. These strips are glued securely to the block 24 and to the pad 27.

I have already pointed out that to obtain the loudest tone, the needle 15 will be placed directly in the regular socket 13, but where softer tones are to be employed, the auxiliary holder 21 is employed, and the needle 15 is thrust into its socket as far as it will go, so that the end which is not in use will engage the metallic bottom of the socket. The set-screw 25 is then screwed up tightly so that its end engages directly with the fiber strip 28 pressing it against the needle, and this gives the greatest possible vibration of the diaphragm, and consequently the loudest possible tone when the auxiliary socket is used. If the tone is to be made slightly softer, the set-screw 25 is turned back so that its end does not engage the fiber 28. If a still softer tone is desired, the needle 15 is pulled out so that its end that is not in use is out of engagement with the bottom of the socket, as shown in Fig. 3, and the set-screw 25 may be tightened to any desired extent, thus furnishing a further modification of the tone. It will of course be understood that the farther the needle is drawn out, the softer the tone.

The point 16 is used in the manner shown on Victor and Columbia records, and the points 17 and 17' may be similarly used by reversing the needle and placing the side opposite to the point that is to be used in

register with the set-screw 25. This set-screw is set at an angle parallel to the axis of the fulcrum of the needle-arm 11, *i. e.*, at right angles to the set-screw 14, and this makes a ready means of setting the needle at the proper angle relative to the groove. Where the needle is to be used for an Edison record, it will of course be used with a sound-box set at the proper angle thereto, and the points 16 or 17 or 17' may be used. When it is to be used with a Pathé record, the sound-box will of course be set in the same manner as for an Edison record, but the point or ball 18 will be employed.

While I have herein disclosed my novel stylus, I do not herein claim the same, as it is covered by my application No. 324, filed January 4, 1915, and while I have shown my novel tone modifying and regulating holder as employed with this specific stylus, for which it was especially devised, it will be understood that it can be used in the same manner and for the same purpose with other different styli, such as are commonly in use.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art. I am aware of the structure shown in the patent to Haile, No. 963,546, dated July 5, 1910, and do not claim the same as my invention.

What I do claim as new, and desire to secure by Letters Patent of the United States, is:

1. A needle-holder of inelastic and unyielding material for talking-machines having a cylindrical pocket in which is placed a cushioning block of soft rubber in the upper half of the pocket divided along its length, and a soft fibrous pad in the lower half, the meeting faces of the block and pad being shaped so as to receive the body of the needle without further compressing them.

2. A needle-holder of inelastic and unyielding material for talking-machines having a cylindrical pocket in which is placed solid cushioning material engaging the sides of the pocket and having the needle-holding socket along the center of the axis, and a hard lining corresponding to the shape of the needle secured in said socket.

In witness whereof, I have hereunto set my hand and affixed my seal, this ninth day of March, A. D. 1917.

ANTON H. RINTELMAN. [I. s.]

Witness:

JOHN HOWARD McELROY.

AUTOMATIC STOP FOR PHONOGRAPHS AND OTHER ROTARY
MECHANISM.

1,252,951 ----- H. E. Rider,
Patented Jan. 8, 1918,
Filed July 29, 1915.

H. E. RIDER.
 AUTOMATIC STOP FOR PHONOGRAPHS AND OTHER ROTARY MECHANISM.
 APPLICATION FILED JULY 29, 1915.

1,252,951.

Patented Jan. 8, 1918.

Fig. 1.

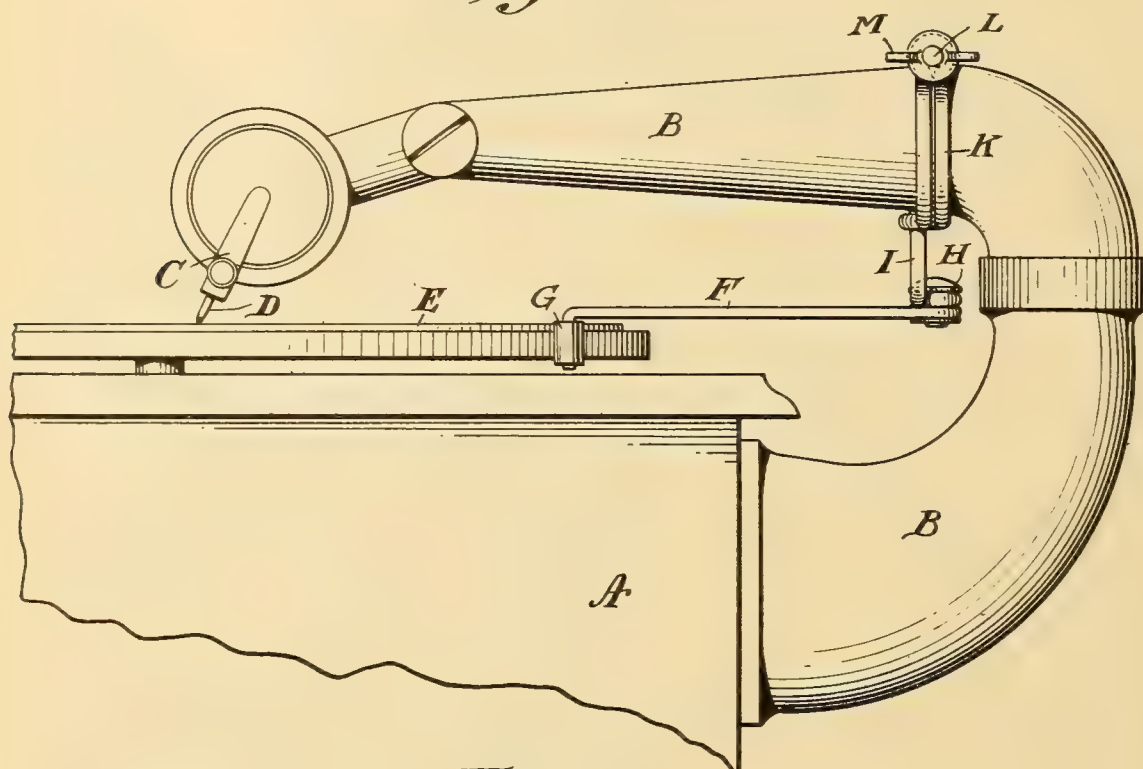


Fig. 2.

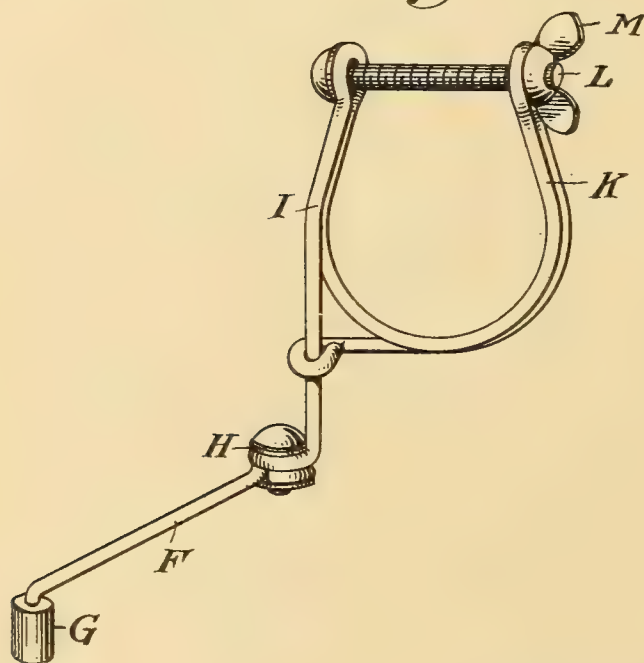


Fig. 3.



Attest:
M. McJinn
 M. Davey.

Herbert E. Rider Inventor:
 by *W. P. Preble* Att'y.

UNITED STATES PATENT OFFICE.

HERBERT E. RIDER, OF BROOKLYN, NEW YORK, ASSIGNOR TO AUTOMATIC PHONO-STOP COMPANY, INC., A CORPORATION OF NEW YORK.

AUTOMATIC STOP FOR PHONOGRAPHS AND OTHER ROTARY MECHANISM.

1,252,951.

Specification of Letters Patent.

Patented Jan. 8, 1918.

Application filed July 29, 1915. Serial No. 42,478.

To all whom it may concern:

Be it known that I, HERBERT E. RIDER, a citizen of the United States, and a resident of Brooklyn borough, New York city, and State of New York, have invented certain new and useful Improvements in Automatic Stops for Phonographs and other Rotary Mechanism, of which the following is a specification.

10 The object of my invention is to provide a simple, strong and effective automatic stop for phonographs and other machines, which comprise a rotating disk, drum, wheel or other rotary mechanism, which it may be desirable or advantageous to check silently and safely at some special point of its running.

Heretofore such stops as have been employed have, so far as I know, been complicated, too abrupt in their action, noisy and frequently requiring re-adjustment to insure a proper repeated action. In my device the action of the stop is absolutely regular and automatic, only one adjustment being required for a given size of rotary device to be acted upon; the braking action is preferably a rolling, silent application of what may be termed a spring like or elastic increasing pressure, whereby the rotary mechanism, however delicate, and through it the machine itself may be brought to a full stop without injury.

To this end my invention consists broadly of a suitable friction bracket, swingingly mounted upon a spring friction bearing, adapted to be adjusted in any desired position so that in its travel it will contact with the rotating device at such pre-determined point as may be desired and necessary for the proper stoppage thereof.

Many different forms of apparatus or bracket may be constructed, as desired, embodying this principle without departing from my invention and I have therefore selected for illustration in the accompanying drawings one of the simplest embodiments of my invention, namely a steel spring structure, adapted for application to the tone arm of a phonograph or talking machine the reproducer of which is fed across the record by a spiral groove.

This particular device can be manufactured at such small cost that it is available for use even with the least expensive phonographs.

Figure 1 is a side view showing this simple type of my device secured to the needle arm of the phonograph.

Fig. 2 is a perspective view of the stop or bracket as complete in itself, disconnected from the phonograph.

Fig. 3 is a top view of a split washer, which is a convenient form of spring friction bearing to permit and govern the adjustment of the bracket shown in Fig. 2.

Same letters indicate similar parts in the different drawings.

A, is the cabinet or casing containing the phonograph. B is the needle carrying arm. C is the needle holder. D is the needle and E is the phonograph disk, on which the needle travels. All these parts are of usual and well known construction.

My improved stop, as here shown, consists of a suitable friction bracket F, having rolling friction tip G, and swingingly mounted upon a spring friction bearing H, which may take the form of a split washer as shown in Fig. 3, a spring bronze washer or other suitable forms.

This bracket is designed to press against the periphery of the phonograph disk E, at the proper time with sufficient yielding force to brake its action gently and stop its further rotation and therefore may be swingingly mounted in such relation to the needle carrying arm B, as may be necessary to cause said rolling tip to act at the exact instant desired. A convenient way of mounting this swinging bracket to accomplish this result is, as shown, a supporting spring arm I, which forms a part of an adjustable clutch loop or yoke K, adapted to be drawn together by the screw-bolt L, and winged-nut M. This adjustable yoke is designed to encircle some part of the needle carrying arm B and to grasp the same with sufficient firmness to be moved in unison with said needle arm.

Other and more elaborate forms of the friction bracket, spring friction bearing, and the supporting structure may be used if desired.

When this automatic stop is properly secured in position to move correspondingly with the needle carrying arm as shown, its adjustment to the phonograph disk is made as follows:—

A record being placed in position on the phonograph, the needle arm, before starting

the mechanism, is moved so as to bring the needle directly over the last note indentation on the disk and the rolling tip is then brought by hand into proper contact with the edge of the disk by applying sufficient force to overcome the grip of the spring friction bearing, and is then released. The spring friction bearing thereupon holds the swinging bracket in that exact relation to the position of the needle carrying arm, until occasion should arise to alter the adjustment by again applying sufficient pressure to overcome the power of the friction bearing. The needle arm, carrying with it a swinging friction bracket, is now brought back to the beginning of the piece to be played and the phonograph is stopped.

It will thus be seen that as the needle, traveling over the disk, approaches the last note of the record thereon, the friction tip will be brought against the edge of the disk and gradually cause further rotation to cease, such grip becoming ultimately effective when the last note is reached.

The principle involved in this automatic stop, whether applied to phonographs or other moving or rotating mechanism or de-

vices, is that the pressure constantly exerted by the friction bearing, around which the bracket turns should be sufficient to overcome with a somewhat yielding but continuous pressure the power which rotates or moves the apparatus which is to be stopped, but small enough to be itself overcome by hand when re-adjustment becomes necessary or desirable.

It will be evident that, if desired, the various parts constituting my improved stop may be made extensible or otherwise adjustable without in any way affecting the application of the above principle.

I claim:—

An automatic stop for phonographs and other rotary machines, which consists of a bracket, having a rolling friction tip, a spring friction bearing on which said bracket is mounted, adapted to exert an adjustable grip upon said bracket, and means for attaching the same to a tone arm of the machine.

HERBERT E. RIDER.

Witnesses:

M. DAVEY,

W. P. PREBLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

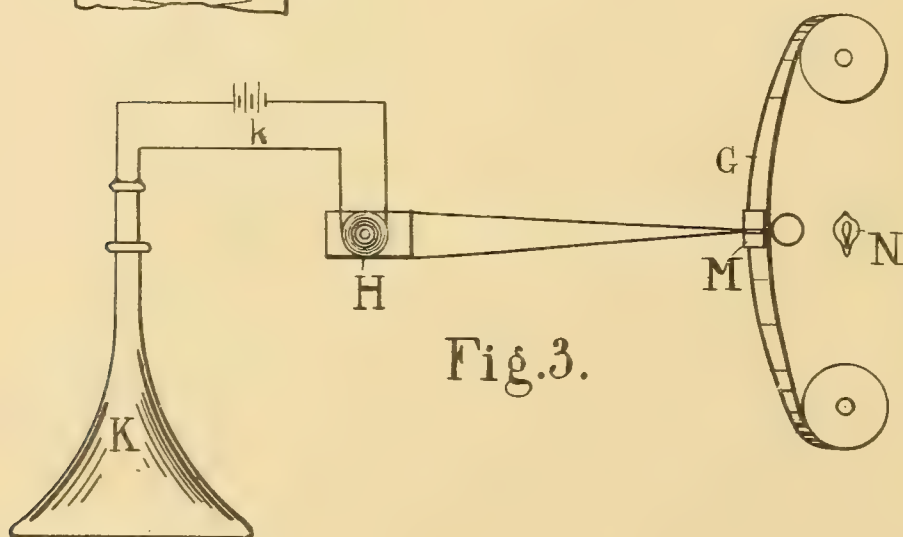
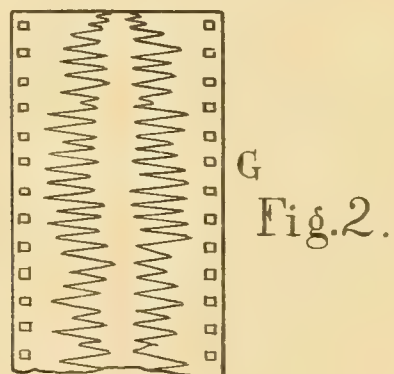
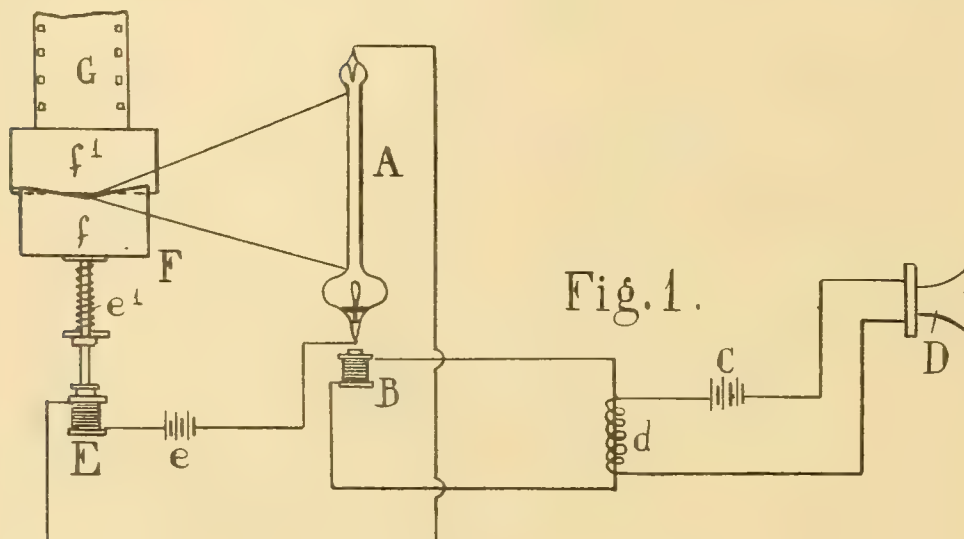
APPARATUS FOR RECORDING SOUNDS PHOTOGRAPHICALLY.

1,252,965 ----- H. B. Stocks,
Patented Jan. 8, 1918,
Filed Oct. 7, 1915.

H. B. STOCKS.
 APPARATUS FOR RECORDING SOUNDS PHOTOGRAPHICALLY.
 APPLICATION FILED OCT. 7, 1915.

1,252,965.

Patented Jan. 8, 1918.
 2 SHEETS—SHEET 1.



Witnesses:

C. Schuler

M. E. McAdams

Inventor

Harry B. Stocks

by

James L. Norris
 Attorney

H. B. STOCKS.
 APPARATUS FOR RECORDING SOUNDS PHOTOGRAPHICALLY.
 APPLICATION FILED OCT. 7, 1915.

1,252,965.

Patented Jan. 8, 1918.
 2 SHEETS—SHEET 2.

Fig. 4.

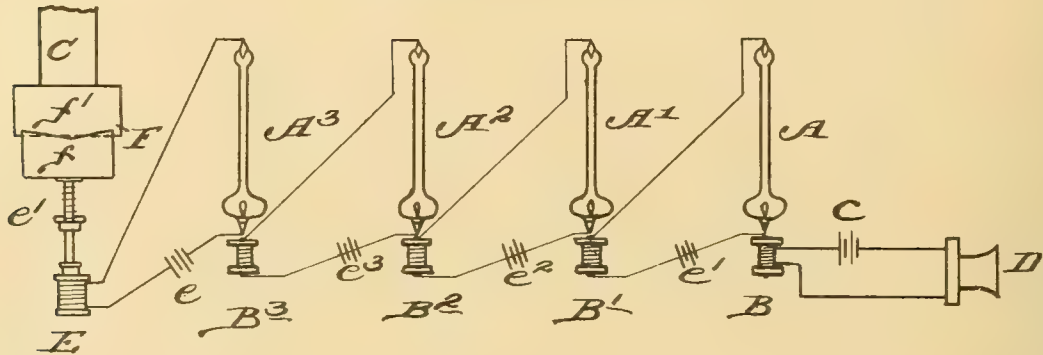
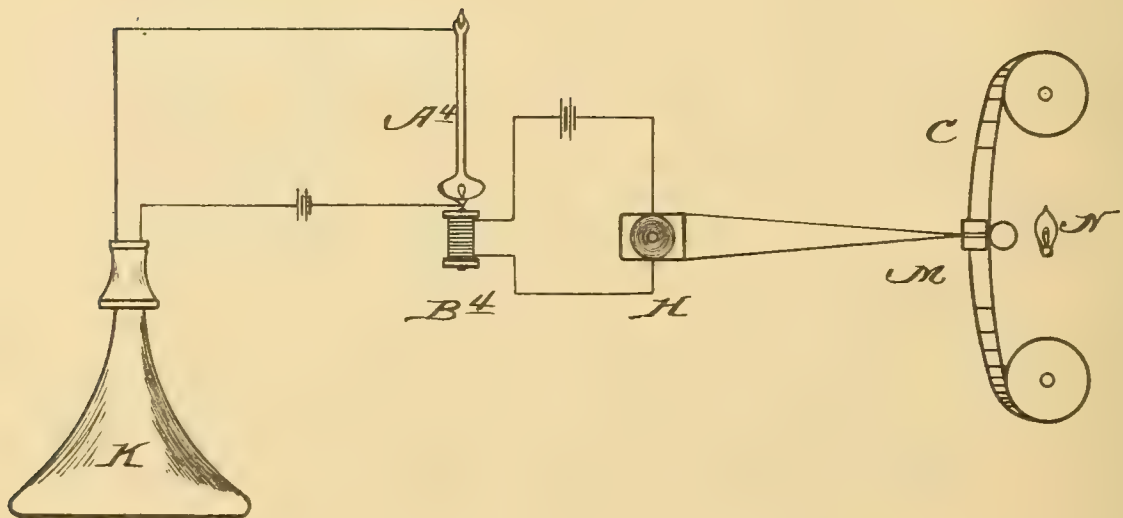


Fig. 5.



Witnesses:

Ed. Kessler
Cal Bateman

Inventor

Harry B. Stocks

by

James L. Norris

Attorney

UNITED STATES PATENT OFFICE.

HARRY BENWELL STOCKS, OF NORTHENDEN, ENGLAND.

APPARATUS FOR RECORDING SOUNDS PHOTOGRAPHICALLY.

1,252,965.

Specification of Letters Patent.

Patented Jan. 8, 1918.

Application filed October 7, 1915. Serial No. 54,626.

To all whom it may concern:

Be it known that I, HARRY BENWELL STOCKS, a British subject, residing at Northenden, county of Chester, England, have invented certain new and useful Improvements in Apparatus for Recording Sounds Photographically, of which the following is a specification.

This invention relates to recording sounds photographically upon a film strip to be subsequently re-produced by means of light transmitted through the film upon a selenium cell.

The primary object of the invention is to provide apparatus whereby sounds or sound waves are recorded by enlarging or reducing the aperture of a shutter synchronously with an increase or a reduction, respectively, in the intensity of light projected or cast upon a light sensitive film to produce upon such film a record which varies both in width and density.

It consists essentially in the employment in the electric circuit through which the sound is transmitted of a mercury vapor lamp of high actinic power, the internal electric resistance of which and the intensity of the light therefrom are controlled by an electromagnet or solenoid and in the combination therewith of a second magnet or electromotor in the lamp circuit controlling or operating a shutter through which the light passes so that the movements of the shutter synchronize with the increase or decrease of intensity of the light, a greater volume of light being projected through the shutter when the light is intense and a lesser volume of light as the intensity of the light is decreased.

The invention will be fully described with reference to the accompanying drawings.

Figure 1 is a diagrammatic view of the improved apparatus for transmitting the sounds to the film record.

Fig. 2 is a length of film showing the record produced thereon by the apparatus.

Fig. 3 is a diagrammatic view of apparatus for reproducing the sounds from the photographic film record.

Fig. 4 is a diagrammatic view showing a

plurality of lamps arranged in cascade to increase the power acting on the shutter.

Fig. 5 is a diagrammatic view showing a modification of the arrangement of Fig. 3.

The apparatus is constructed with a mercury vapor lamp A having an electromagnet B arranged below and with its lines of force directed upwardly toward the negative electrode of the lamp, this electromagnet being energized by a battery C and microphone or other telephone transmitter D. The mercury vapor lamp A is in circuit with a second electromagnet E and battery *e* and as the internal resistance in the lamp varies inversely with respect to variations in the extent of upward projection of the negative flame of the lamp under the influence of the magnetic field of the magnet B, the power of the magnet E is increased or reduced. As the internal resistance in the mercury vapor lamp A decreases in accordance with an increase in the upward projection of the negative flame of the lamp, the light of the lamp increases in intensity and simultaneously and in synchronism therewith the power of the magnet E also increases. The variations of current in the microphone or telephone circuit cause increased variations in the magnetic field of the magnet B, these variations in the magnetic field of the magnet B in turn causing variations in the extent of upward projection of the negative flame of the lamp, causing, in consequence, variations in the amount and the intensity of the light produced by the lamp. A shutter F constructed of a plate *f* preferably of V shape moving past a plate *f'* is operated by the electromagnet E being attracted to and moved toward the magnet when energized against the pressure of a spring *e'* which moves it in opposite direction. The shutter F is thus opened wider and a greater volume of light is permitted to pass and impinge upon the film at the same time as the intensity of the light of the lamp is increased. The opening in the shutter closes or lessens as the intensity of the light of the lamp decreases, and thus the amount and intensity of the light projected through the shutter F vary at the same time.

The mercury vapor lamp A placed in the circuit renders very sensitive the electric resistance of the circuit and the magnetic intensity of the electromagnet E, in circuit therewith, causing said magnet to operate the shutter F in response to the initial impulse in the circuit at the telephone or microphone transmitter D. Two or more mercury vapor lamps may be arranged in cascade to increase the power acting on the shutter F. Such an arrangement is shown in Fig. 4, wherein four lamps A, A', A² and A³ are employed, these lamps being provided with electromagnets B, B', B² and B³ and batteries e, e', e² and e³.

The electromagnet E instead of being in the circuit with the battery e may be in a secondary circuit energized therefrom.

The transmitter D may be directly in circuit with the electromagnet B or a transformer coil may be interposed, as at d, Fig. 1.

The record produced on the film G is represented in the diagram Fig. 2 which can be used as a negative from which to photographically print or reproduce any number of records.

For reproducing the sounds from the film record G apparatus is constructed as shown in Fig. 3 with a selenium cell H in circuit with a telephone receiver K and battery k.

The film record G is passed behind a slotted plate M and in front of an ordinary lamp N of fixed candle power or intensity. As the film is traveled past the slot in the plate, the beams of light from the lamp pass through the film and on to the selenium cell H, the volume and intensity of the light varying respectively with the width of the transparent parts of the film, and the degree of transparency thereof, and thereby causing sounds to be reproduced by the action of the selenium cell H on the receiver K varying in duration and intensity in exact accordance with the sounds originally spoken into the transmitter D of the recording apparatus illustrated in Fig. 1.

To intensify the sounds reproduced from the sound film record G a mercury vapor lamp or lamps such as A of Fig. 1 controlled by an electromagnet may be introduced into the circuit between the selenium cell H and telephone receiver K shown in Fig. 3. Such an arrangement is shown in Fig. 5, wherein a mercury vapor lamp A⁴ controlled by an electro-magnet B⁴ is introduced into the circuit between the selenium cell H and the telephone receiver K.

The synchronizing of the sound film record G during exhibition with the cinematograph picture film record will be effected by adjusting the speed by which the films are drawn through the exhibiting machines or lanterns. The sound film record G may be

produced on a length of film of single width as shown in Fig. 2 or may be produced upon a double width film one half of which will receive the sound record and the other half of which will receive the picture record.

What I claim as my invention and desire to protect by Letters Patent is:—

1. In apparatus for recording sounds photographically, the combination with a microphone circuit, of an electro-magnet having its magnetic power controlled by said circuit, a mercury vapor lamp of high actinic power the electric resistance of which is controlled by said electro-magnet and the intensity of light of which varies in accordance with variations in current flow in the microphone circuit, and a shutter controlled by said lamp to increase the size of its aperture when the intensity of light from the lamp increases and to reduce the size of its aperture when the intensity of such light diminishes.

2. In apparatus for recording sounds photographically, the combination with a microphone circuit, of an electro-magnet in said circuit, a second electric circuit, a mercury vapor lamp in said second circuit and controlled by the electro-magnet of the microphone circuit, an electro-magnet in the lamp circuit, and a shutter operated and controlled by the magnet in the lamp circuit and through which a varying beam of light is projected onto a sensitized film.

3. Apparatus for recording sounds photographically comprising a microphone circuit, a shutter, a photographically sensitive medium to which light is admitted by said shutter, a mercury vapor lamp of high actinic power whose intensity varies with its internal electrical resistance, said lamp being controlled by said microphone circuit, the light from the lamp being projected through the shutter onto the sensitive medium, and means controlled by the lamp for increasing and diminishing the extent of opening of the shutter in accordance with variations in the intensity of light from the lamp.

4. Apparatus for recording sounds photographically comprising a transmitter circuit, a mercury vapor lamp circuit having a magnet therein, and a shutter operated by said magnet to increase and diminish the size of its aperture when the intensity of the light of said lamp increases and diminishes, respectively, the lamp being controlled and its intensity varied by the transmitter circuit.

5. Apparatus for recording sounds photographically upon a film strip comprising a transmitting instrument, an electric battery and circuit, an electro-magnet in the circuit, a mercury vapor lamp controlled by the magnet in the transmitter circuit, an electric battery and circuit for the lamp, an electro-motor in the lamp circuit, and a shutter com-

prising two plates one of which is V-shaped and is operated and controlled by the electro-motor, the shutter providing a slit through which the beam of light from the
5 lamp is projected onto said film strip.

6. The method for producing a sound film record having a record thereon varying both in density and amount which consists in varying the internal resistance and consequently the intensity of the light produced
10 by a mercury vapor lamp in accordance with

corresponding variations of sound waves, and producing a photographic record of the variations of intensity and of the amount of light produced by the lamp.

15

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HARRY BENWELL STOCKS.

Witnesses:

J. OWDEN O'BRIEN,
GEO. H. O'BRIEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RECORD CABINET.

1,253,008 ----- F. Coss,
Patented Jan. 8, 1918,
Filed May 14, 1917.

F. COSS.
 RECORD CABINET,
 APPLICATION FILED MAY 14, 1917.

1,253,008.

Patented Jan. 8, 1918.
 2 SHEETS—SHEET 1.

Fig. 1.

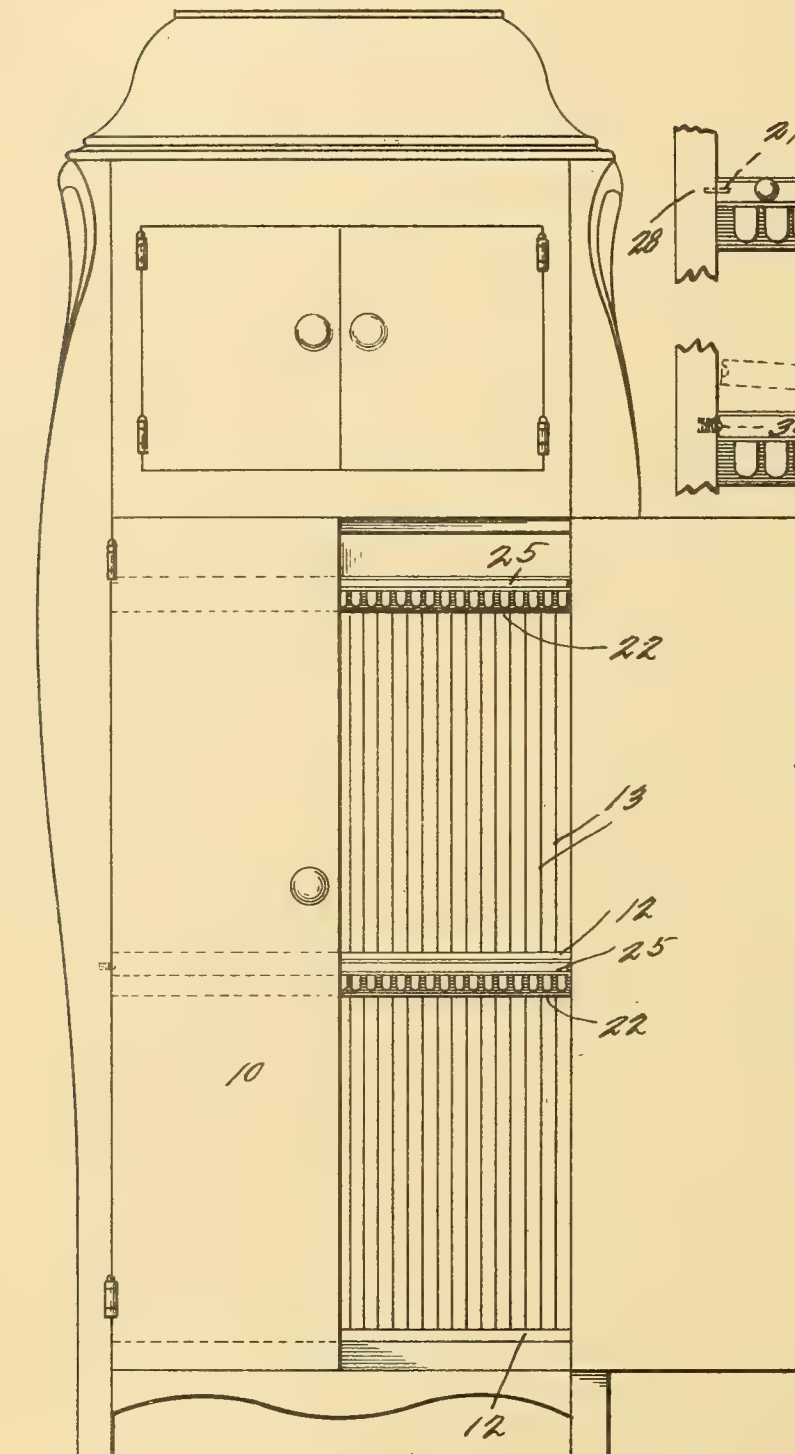


Fig. 6.

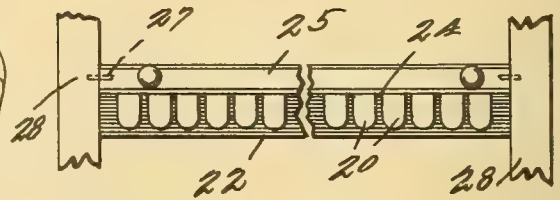


Fig. 7.

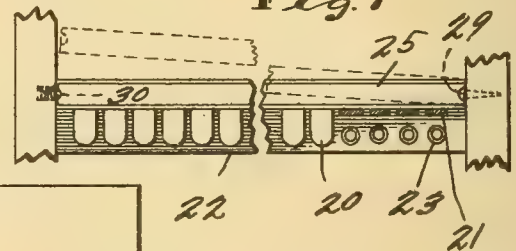
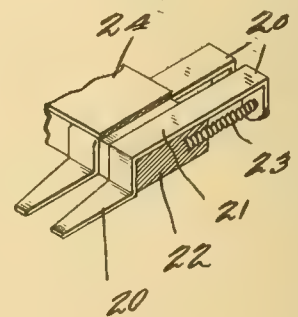


Fig. 8.



Witness
 Frank A. Falk

By

Inventor
 Frank Coss,

Hood & Schly,
 Attorneys

1,253,008.

Patented Jan. 8, 1918.
 2 SHEETS—SHEET 2.

Fig. 2.

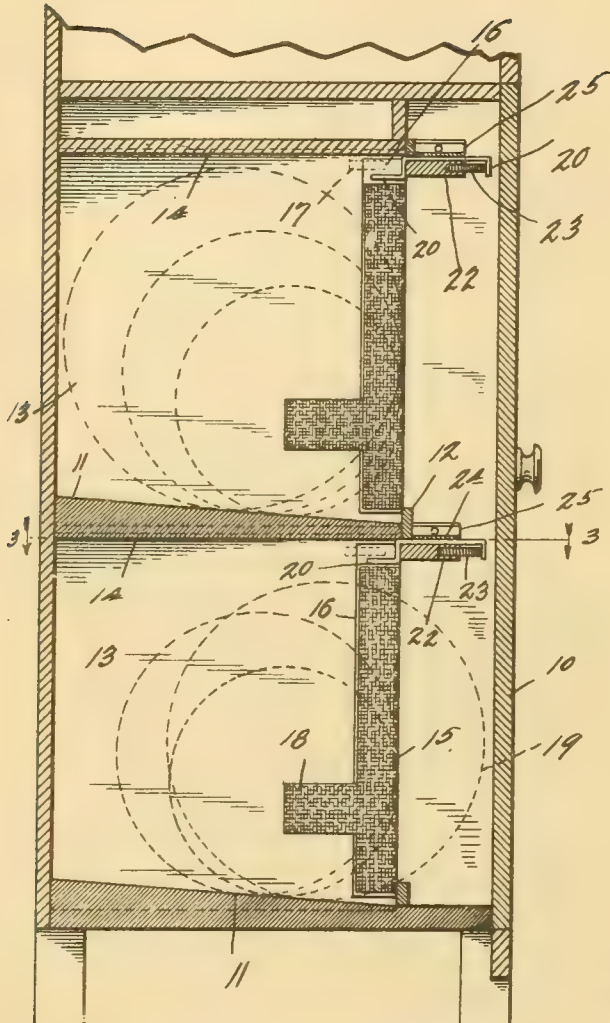


Fig. 4.

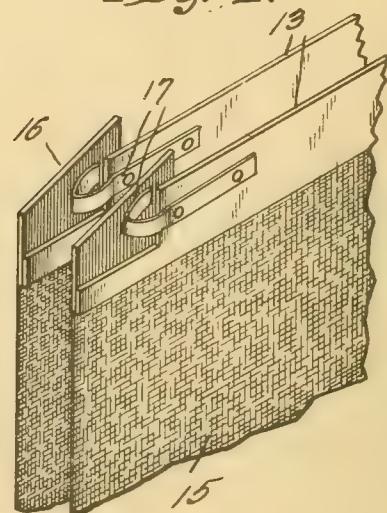


Fig. 5.

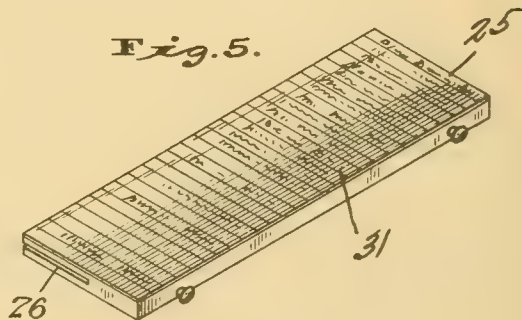
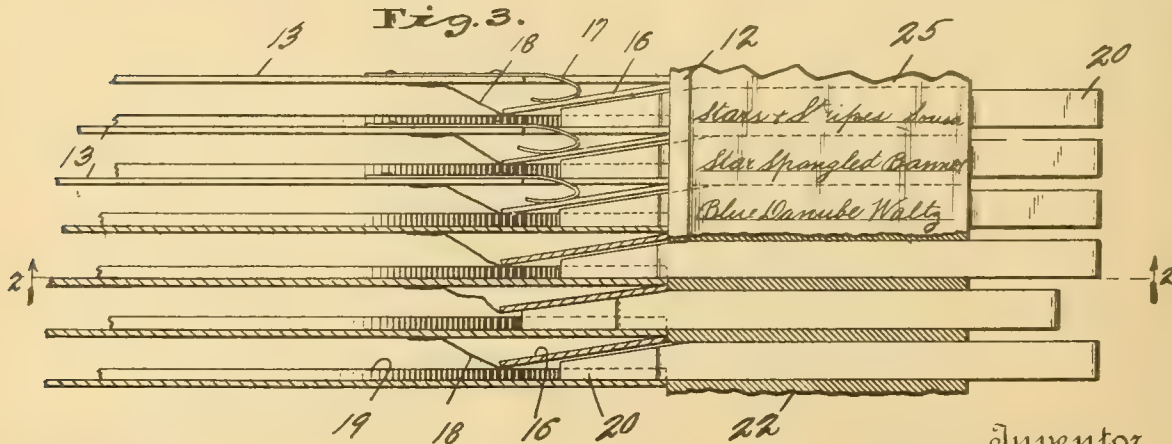


Fig. 3.



Witness
 Frank A. Sahle

By

Inventor
 Frank Coss,

Attorneys

UNITED STATES PATENT OFFICE.

FRANK COSS, OF GREENCASTLE, INDIANA.

RECORD-CABINET.

1,253,008.

Specification of Letters Patent.

Patented Jan. 8, 1918.

Application filed May 14, 1917. Serial No. 168,404.

To all whom it may concern:

Be it known that I, FRANK COSS, a citizen of the United States, residing at Greencastle, in the county of Putnam and State of Indiana, have invented a new and useful Record-Cabinet, of which the following is a specification.

It is the object of my invention to provide a cabinet for phonograph records, whereby the records may be stored compactly and protected from injury and yet each record is easily found and any record may be withdrawn from the cabinet with ease; and to do this by a structure which is simple and inexpensive in construction and efficient in operation.

The accompanying drawings illustrate my invention. Figure 1 is a front elevation of a record cabinet embodying my invention, showing it in connection with a standard talking machine; Fig. 2 is a vertical section through the record cabinet, taken parallel to the planes of the stored records; on the line 2—2 of Fig. 3; Fig. 3 is a partial plan of the record cabinet with the ceiling piece removed and a partial section on the line 3—3 of Fig. 2; Fig. 4 is a partial perspective view of two of the partitions with their associated swinging leaves; Fig. 5 is a perspective view of the removable index board; Fig. 6 is a partial front elevation of such index board and the associated discharge keys below it; Fig. 7 is a similar front elevation of a slightly different form of index board; and Fig. 8 is a partial perspective view of two of the discharge keys and their mounting.

My record cabinet may be embodied in any suitable structure, such as in combination with a talking machine, as shown in Fig. 1, and may consist of any desired number of tiers, two tiers being shown, the record-holding compartment conveniently being provided with the usual doors 10. Each record-holding tier has a floor 11 which is inclined forwardly and downwardly, so that the records when released will roll forward by gravity. They are prevented from rolling entirely out by a stop piece 12 extending transversely of the records and elevated slightly above the floor 11 at its forward edge, so as to stop the record in a position where it can readily be grasped by the person desiring to remove it. Each record is located in a separate compartment, in which it is held on edge, these compartments being

provided by sheet metal plates 13 set in saw kerfs in the floor 11 and the ceiling 14. Each partition plate 13 is provided on one face with a fabric covering 15, which extends around the forward edge of such partition plate and covers the opposite face of a swinging leaf 16 so as to provide a hinge for such swinging leaf and a protecting covering to prevent scratching of the records by the metal of either the partition or the swinging leaf. Each partition 13 is notched at the front upper corner and is provided with a leaf spring 17 which projects through such notch against the side of the associated swinging leaf 16 so as to force the rear edge of such swinging leaf toward the fabric-covered side of the adjacent partition. Thus the swinging leaf 16 forms a spring gripping device for holding the record in the compartment into which said swinging leaf projects, so that until such spring gripping device is released the record will not roll forward along the inclined floor 11. Preferably, an extension of the fabric 15 projects from the free edge of each swinging leaf 16 to the adjacent face of the partition 13 on which such swinging leaf is mounted, as is clear from Figs. 2 and 3, which extension 18 has sufficient slack so that it does not interfere with the swinging of the leaf, but prevents a record which may be pushed into the compartment too far from being caught behind such swinging leaf.

In order to release a record so that it may roll forward along the floor 11, the swinging leaf 16, which normally holds such record, is swung against its associated spring 17 so as to separate it from the record which it holds. This swinging is obtained by wedge-shaped discharge keys 20, one of which projects into the upper end of each record compartment between the swinging leaf 16 and the partition toward which the spring 17 pushes it, so that by pushing in such wedge key the swinging leaf is moved against its spring to release the associated record 19. The second record from the bottom in Fig. 3 is shown released. Each release key is conveniently made of sheet metal of the form shown in Fig. 8, with its wedge-shaped end projecting rearwardly from the lower end of the rear leg of an inverted U-shaped portion 21, and the release keys for all the compartments of a tier are arranged in a horizontal row over a cross bar 22 (Fig. 8) notched on its upper surface

to receive the bases of the U-shaped portions 21 so that the rear leg of such U-shaped portion forms a stop to limit the forward movement of the key and the front leg forms a thumb piece, between which and the cross piece 22 a compression spring 23 tending to push the key forward is mounted. The keys are held in place in their notches in the cross piece 22 by a cover piece 24.

Above each row of keys 20 I preferably provide a removable index board 25, which is directly above the key-cover piece 24 and may take various forms, such as shown in Figs. 5 and 6, or as shown in Fig. 7. In Figs. 5 and 6, the ends of this index board are provided with guide slots 26, which slide over projecting pins 27 from the uprights 28 at the sides of the cabinet, so that the index board may be slid in and out. In the form shown in Fig. 7, the index board has a notch at one end to fit over a screw head 29 and a notch at the other end to cooperate with a spring catch 30, so that to remove the index board it is first swung from the full line position to the dotted line position. The top face of the index board is provided with a suitable record surface, such as a layer 31 of celluloid, which is ruled to provide spaces in the planes of the various record compartments, each space being directly over the associated key 20. The title of the record which is to go into any compartment is written in the corresponding space on the index board, so that the title of the record appears directly over the release key which releases that record, as is indicated in Fig. 3.

In order to obtain any desired record, it is located by its title on the index board, and the corresponding key 20, directly below that title, is pushed in. This pushes aside the swinging leaf 16 which holds that record in its compartment, and allows such record to roll forward along the inclined floor 11 until stopped by the stop piece 12, in which position it can readily be grasped and withdrawn by hand. To replace a record, it needs only to be shoved into its compartment, where it is held automatically by the swinging leaf 16 in such compartment.

I claim as my invention:

1. A record cabinet, comprising a casing having a forwardly slanting floor, a stop member at the forward part of such floor, a plurality of vertical partitions providing individual compartments for record disks between them, and releasable laterally-acting spring-pressed members cooperating with said partitions for holding record disks in the compartments formed thereby.

2. A record cabinet, comprising a casing having a forwardly slanting floor, a plurality of vertical partitions providing individual compartments for record disks between them, and releasable laterally-acting spring-pressed members cooperating with

said partitions for holding record disks in the compartments formed thereby.

3. A record cabinet, comprising a casing having a forwardly slanting floor, a plurality of vertical partitions providing individual compartments for record disks between them, a swinging leaf mounted at the forward end of each partition and spring-pressed toward the adjacent partition to form a gripping member to hold a record disk in the compartment between such two partitions, and a series of discharge keys for separating the respective swinging leaves from the partitions toward which they are pressed so as to release the record disks.

4. A record cabinet, comprising a casing having a forwardly slanting floor, a plurality of vertical partitions providing individual compartments for record disks between them, a swinging leaf mounted at the forward end of each partition and spring-pressed toward the adjacent partition to form a gripping member to hold a record disk in the compartment between such two partitions, and a series of discharge keys for separating the respective swinging leaves from the partitions toward which they are pressed so as to release the record disks, each of said keys including a wedge-shaped member mounted so that it can be pushed in between the associated swinging leaf and the partition toward which it is spring-pressed.

5. A record cabinet, comprising a casing having a forwardly slanting floor, a plurality of vertical partitions providing individual compartments for record disks between them, a swinging leaf mounted at the forward end of each partition and spring-pressed toward the adjacent partition to form a gripping member to hold a record disk in the compartment between such two partitions, a series of discharge keys for separating the respective swinging leaves from the partitions toward which they are pressed so as to release the record disks, and a fabric covering on the record-engaging faces of said partitions and swinging leaves, such fabric covering forming the hinge mounting between the leaves and the partitions on which they are respectively mounted.

6. A record cabinet, comprising a casing having a forwardly slanting floor, a plurality of vertical partitions providing individual compartments for record disks between them, a swinging leaf mounted at the forward end of each partition and spring-pressed toward the adjacent partition to form a gripping member to hold a record disk in the compartment between such two partitions, a series of discharge keys for separating the respective swinging leaves from the partitions toward which they are pressed so as to release the record disks, and

a fabric covering on the record-engaging faces of said partitions and swinging leaves.

7. A record cabinet, comprising a casing having a forwardly slanting floor, a plurality of vertical partitions providing individual compartments for record disks between them, a swinging leaf mounted at the forward end of each partition and spring-pressed toward the adjacent partition to form a gripping member to hold a record disk in the compartment between such two partitions, a series of discharge keys for separating the respective swinging leaves from the partitions toward which they are

pressed so as to release the record disks, and a fabric covering on the record-engaging faces of said partitions and swinging leaves, said fabric having a rearward extension beyond the rear edge of each swinging leaf, which edge is attached to the adjacent face of the partition on which such swinging leaf is mounted.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 9th day of May, A. D. one thousand nine hundred and seventeen.

FRANK COSS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CABINET TALKING MACHINE.

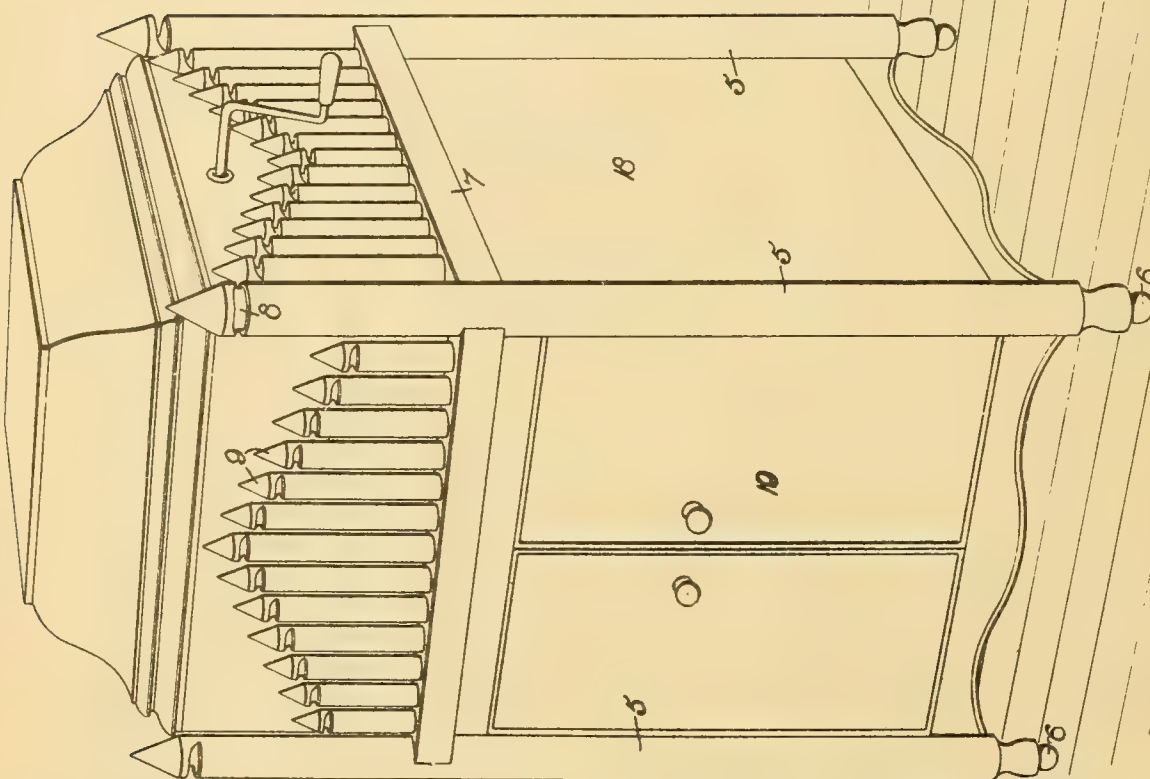
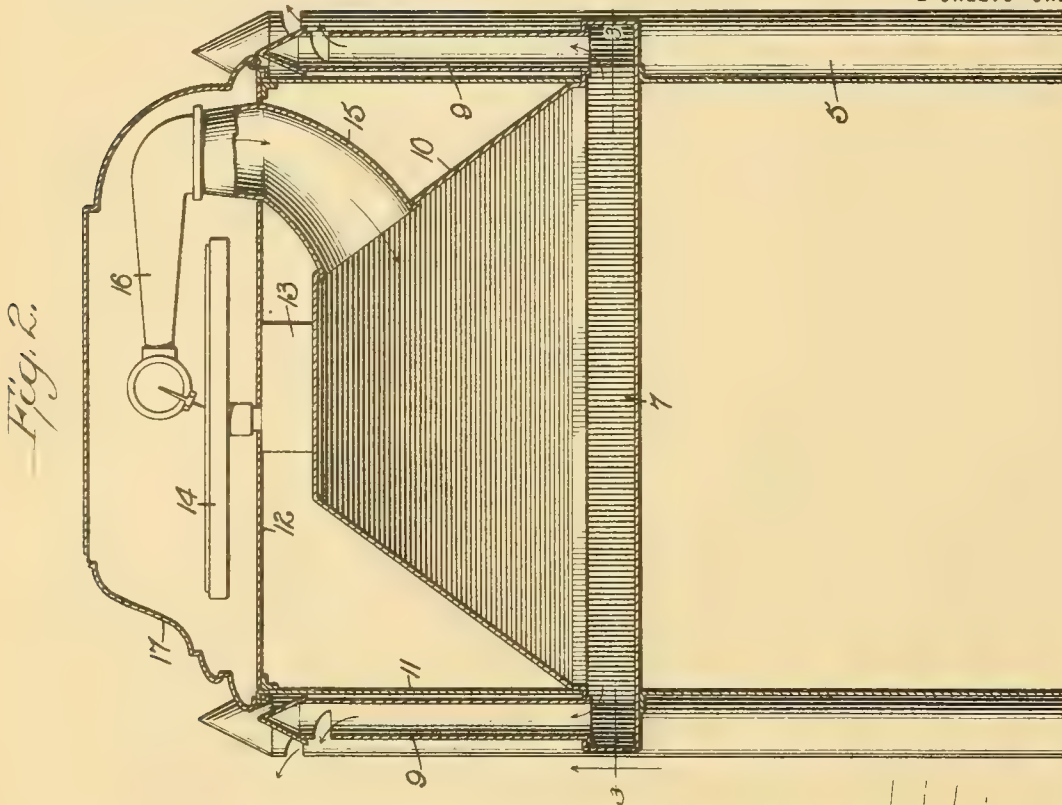
1,253,010 ----- H. D. Darlington,
Patented Jan. 8, 1918,
Filed Nov. 3, 1916.

H. D. DARLINGTON.
CABINET TALKING MACHINE.
APPLICATION FILED NOV. 3, 1916.

1,253,010.

Patented Jan. 8, 1918.

2 SHEETS—SHEET 1.



WITNESSES

Oliver W. Holmes
B. J. Joffe

Fig. 1.

INVENTOR

H.D. Darlington

BY

Wm. H. Darlington
ATTORNEYS

H. D. DARLINGTON.
CABINET TALKING MACHINE.
APPLICATION FILED NOV. 3, 1916.

1,253,010.

Patented Jan. 8, 1918.

2 SHEETS—SHEET 2.

Fig. 3.

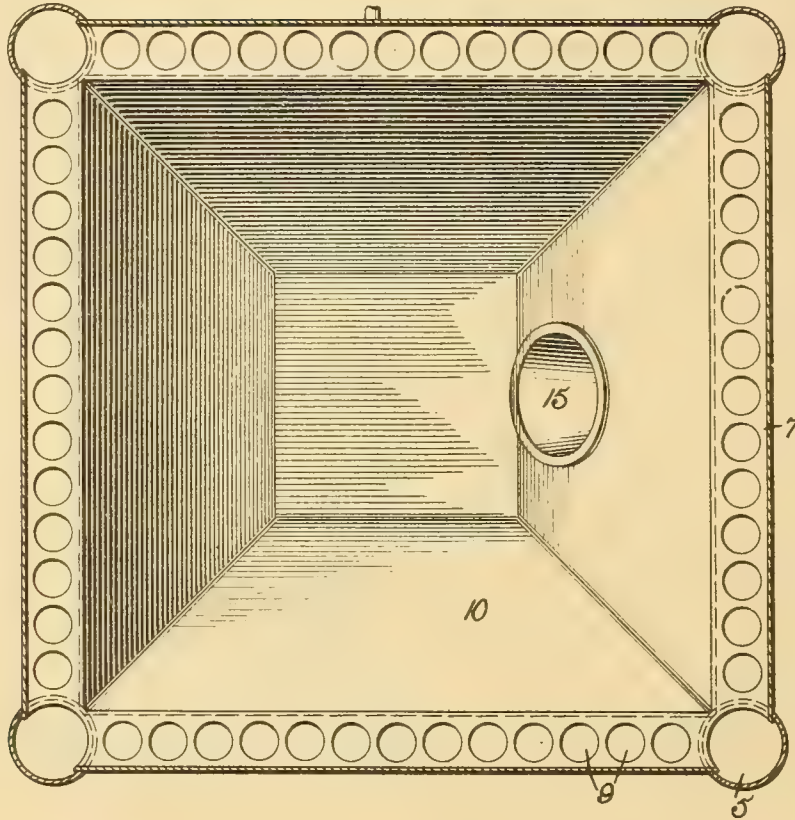
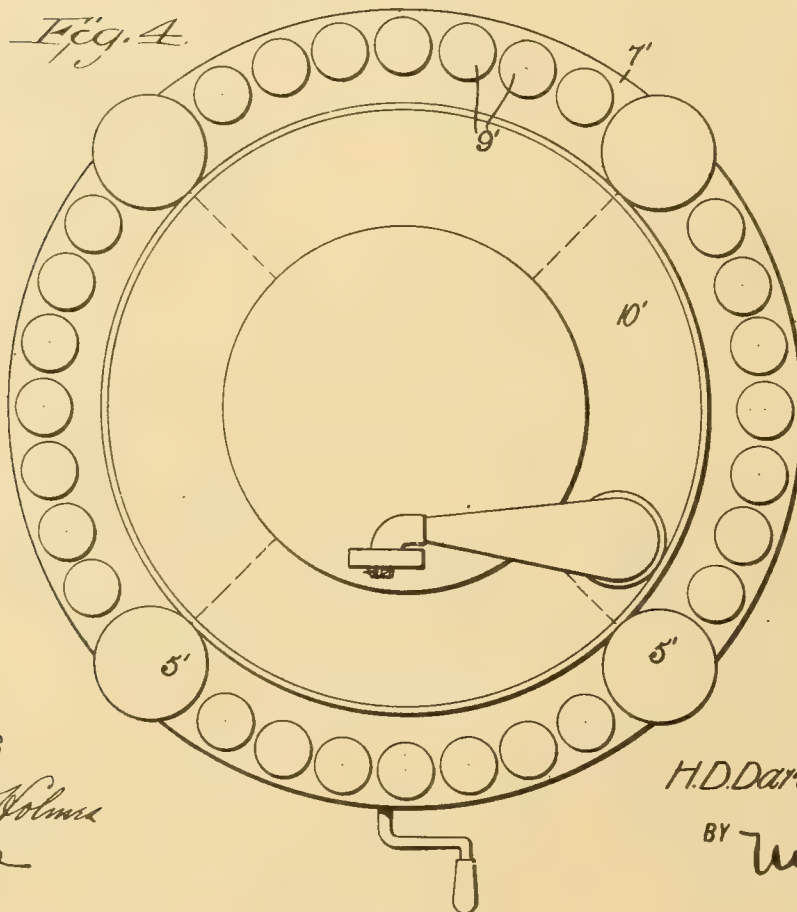


Fig. 4.



WITNESSES

Oliver W. Holmes
B. Joffe

INVENTOR

H. D. Darlington

BY

ATTORNEYS

UNITED STATES PATENT OFFICE.

HOWARD D. DARLINGTON, OF DAYTON, OHIO.

CABINET TALKING-MACHINE.

1,253,010.

Specification of Letters Patent.

Patented Jan. 8, 1918.

Application filed November 3, 1916. Serial No. 129,311.

To all whom it may concern:

Be it known that I, HOWARD D. DARLINGTON, a citizen of the United States, and a resident of Dayton, in the county of Montgomery and State of Ohio, have invented a new and Improved Cabinet Talking-Machine, of which the following is a full, clear, and exact description.

My invention relates to cabinets for talking machines. An object thereof is to provide a cabinet of a novel construction in which sound pipes are utilized in connection with the amplifying chamber of the cabinet.

Another object of the invention is to provide a cabinet which is made of metal.

With the above and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts as herein fully described, illustrated and claimed.

In the accompanying drawings, forming part of the application, similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective elevation of a cabinet embodying my invention;

Fig. 2 is an enlarged longitudinal section thereof illustrating the connection between the sound pipes and the amplifying chamber;

Fig. 3 is a horizontal section on line 3—3 Fig. 2; and

Fig. 4 is a plan view of a cabinet cylindrical in form.

Referring to the drawings, 5 5 are tubular metal standards which constitute the support of the cabinet, suitable casters 6 being provided at the lower ends of said standards to facilitate the displacement of the cabinet. The standards are united by a shallow chamber 7 nearer the upper ends of said standards. Each of said standards has a sound-pipe opening 8 near the upper end thereof. The bottom of the chamber 7 separates the lower part of the standard 5 from the part above the chamber and which is in communication with said chamber. A plurality of sound pipes 9 are disposed on the top of the chamber 7 along each edge thereof between the upper parts of the standards 5, said pipes being preferably made of brass. These pipes are of various lengths and,

consequently, are adapted to produce different tones.

Mounted on the top of the chamber 7 is a frusto-pyramidal-shaped chamber 10 the base of which opens into the chamber 7. This chamber is preferably made of the same metal as the chamber 7. It is surrounded by a housing 11 which rises from the chamber 7 in the rear of the pipes 9, the top 12 of said housing being spaced from the top of the chamber 10 to accommodate the transmission means from the member 13 to the disk support 14 mounted above the top 12. The chamber 10 has a conduit 15 extending through the top 12 of the housing 11 whereat the amplifying arm 16 is connected to the conduit. A suitably-shaped cover 17 is secured to the top 12 of the housing. The standards 5 below the chamber 7 are united by wall members 18 on three sides. This inclosure is properly subdivided to form a cabinet for storing records, a suitable door 19 being provided to give access to the inclosure formed below the chamber 7.

In Fig. 4 a modified structure is shown in which the cabinet is cylindrical in form. The standards 5' are in communication with the circular chamber 7' which carries the sound pipes 9' near the margin of the chamber. The chamber 10', in lieu of being pyramidal, is conical, but the relation of it with the chamber 7 and the rest of the structure of the cabinet is substantially the same.

I claim:

1. The combination of a tapered amplifying chamber closed at one end, and a plurality of sound pipes of different lengths rising from the closed end of said chamber.

2. In combination with the upwardly-tapering amplifying closed chamber of a talking machine, a plurality of sound pipes connected to said chamber near the bottom thereof so that the sound waves must travel through said pipes.

3. A cabinet for talking machines comprising an upwardly-tapering amplifying chamber, a housing surrounding the amplifying chamber, a shallow chamber in communication with the bottom of the amplifying chamber, and sound pipes rising from said shallow chamber about the housing.

4. A cabinet for talking machines com-

prising tubular standards, a shallow chamber in communication with said standards nearer to the top thereof, an upwardly tapering amplifying chamber supported by
5 the shallow chamber and in communication therewith, the upper portion of said standards constituting sound pipes, a hous-

ing resting on the shallow chamber and inclosing said amplifying chamber, and a plurality of sound pipes supported by said shallow chamber and in communication therewith disposed about said housing.

HOWARD D. DARLINGTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH.

1,253,276 ----- J.H. Phillips, Jr.,
Patented Jan. 15, 1918,
Filed Aug. 11, 1917.

1,253,276.

Patented Jan. 15, 1918:

FIG. I

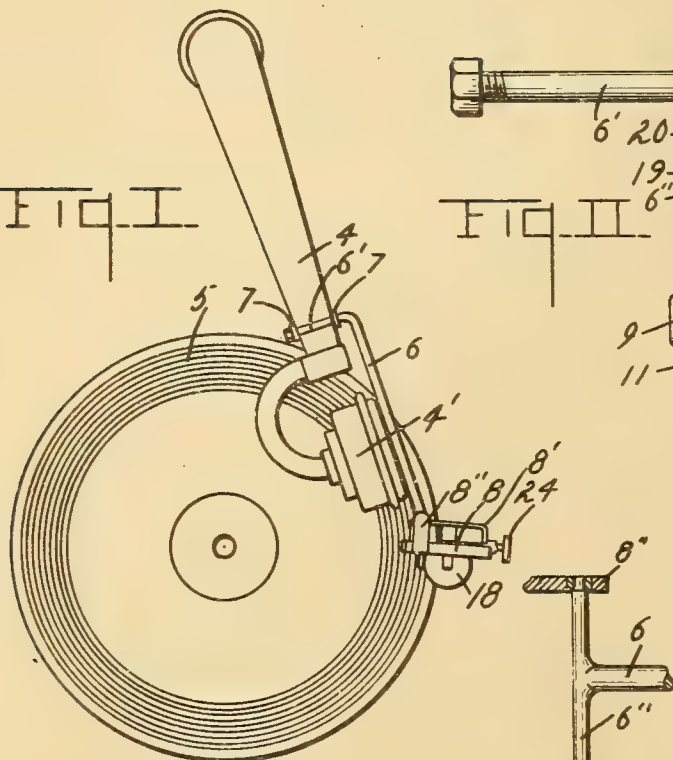


FIG. II

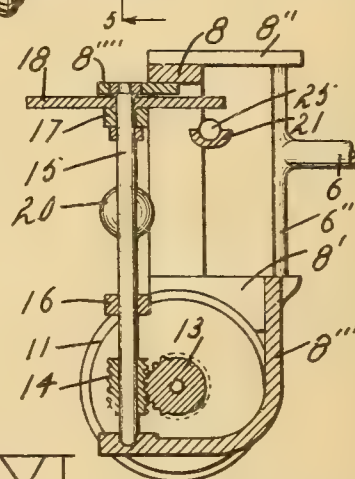
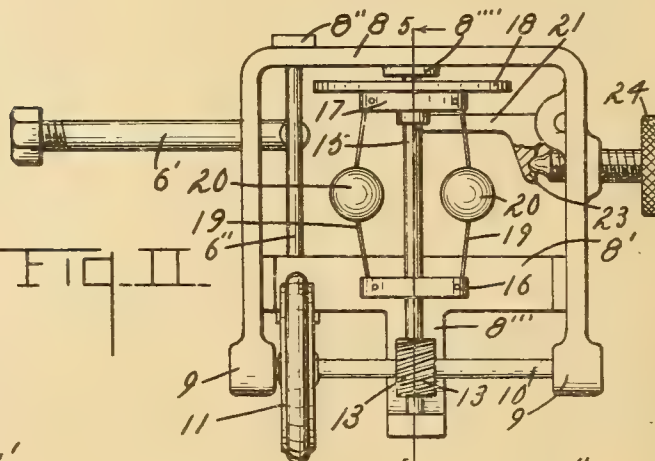


FIG. IV

FIG. V

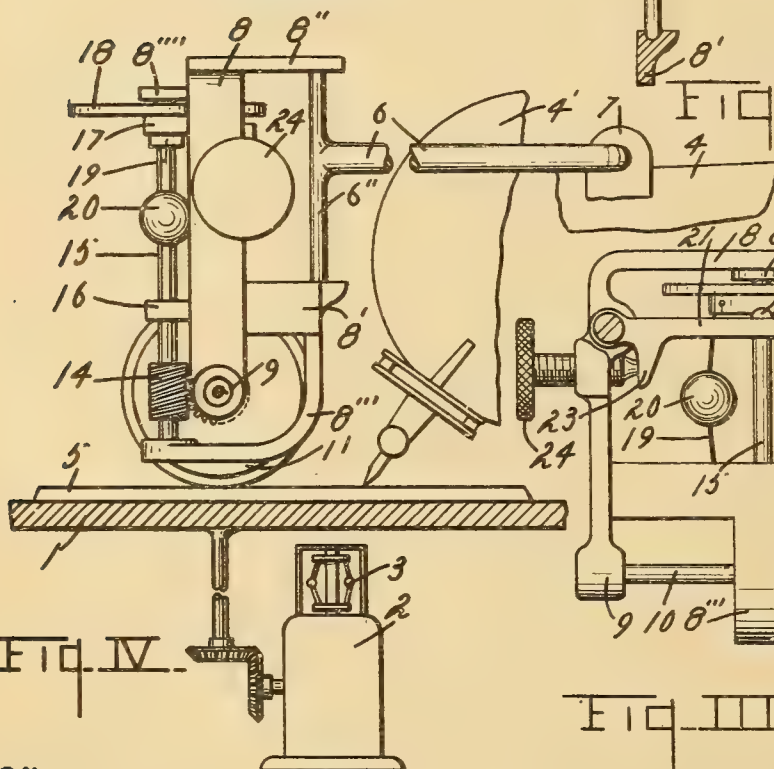
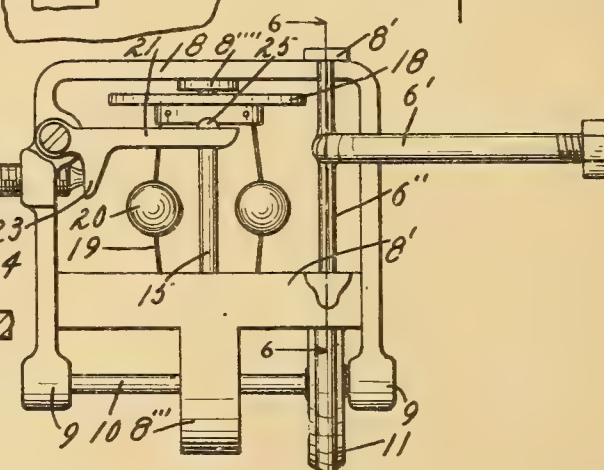


FIG. III



Inventor
 JOHN HENRY PHILLIPS JR

Witness
 Luther Blake
 Glenn Harris

By *Chappell & Carl*
 Attorney

UNITED STATES PATENT OFFICE.

JOHN HENRY PHILLIPS, JR., OF JACKSON, MICHIGAN.

PHONOGRAPH.

1,253,276.

Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed August 11, 1917. Serial No. 185,687.

To all whom it may concern:

Be it known that I, JOHN H. PHILLIPS, Jr., a citizen of the United States, residing at the city and county of Jackson, State of Michigan, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

This invention relates to improvements in phonographs.

My improvements relate particularly to governor mechanisms for phonographs for reproducing disk records of the kind shown in my co-pending application, Ser. No. 165,392, filed April 30, 1917, in which those portions or undulations of the spiral sound grooves formed by sounds of equal duration are of substantially equal length without regard to the position thereof in the sound groove.

The main objects of my invention are:

First, to provide in a phonograph an improved means whereby the speed of the record surface relative to the reproducing needle is of constant velocity and may be regulated as desired.

Second, to provide in a phonograph an improved means for uniformly increasing the angular velocity of the turn table, so that the speed of the record surface relative to the reproducing needle is constant.

Third, to provide in a phonograph an improved means for accomplishing these results, which may be readily applied to a phonograph of the usual construction and adjusted to and from operative position, so that it may be employed in conjunction with the usual governing means.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a detail view of a structure embodying the features of my invention, no attempt having been made to maintain proper relative proportions between the various parts illustrated.

Fig. II is a front elevation of my improved governing means removed from the machine.

Fig. III is a rear elevation thereof.

Fig. IV is a detail side elevation, portions being broken away and portions shown in section for convenience in illustration.

Fig. V is a detail view, partially in vertical section, on a line corresponding to line 5—5 of Fig. II.

Fig. VI is a detail section on a line corresponding to line 6—6 of Fig. III.

In the drawing, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the reference character 1 indicates the turn table, 2 the motor, 3 the speed governor, 4 the tone arm, and 4' the sound box of a phonograph. These parts are shown mainly in conventional form and, as their details form no part of my present invention, they are not illustrated or described herein.

The record 5 is also shown conventionally, but it is intended to illustrate a record such as that described in my co-pending application hereinbefore referred to, having a spiral sound groove in which the sound undulations produced by sounds of equal duration are of substantially equal length, as are also the spaces between the sound undulations caused by intervals of equal duration between recorded sounds.

In order to properly reproduce these records the records should be driven so that the angular velocity increases uniformly as the reproducing needle travels toward the center of the record, so that the speed of the record surface relative to the needle remains substantially constant. This I accomplish by my improved governing means.

In the embodiment of my invention illustrated, I provide a T-shaped supporting arm 6, the end of the stem of which is turned at right angles thereto and secured to the tone arm 4 of the phonograph by means of the clip 7. The laterally turned portion 6' constitutes a pivot or journal for the arm. The head 6'' of the T is disposed in a vertical plane providing a journal for the governor frame 8,—see Fig. VI. The frame 8, which is yoke-shaped, is provided with a cross piece or bracket 8' and with a bracket 8'' provided with bearings for the head or journal 6'' of the supporting arm. The lower ends of the arm of the yoke-like frame 8 are provided with bearings 9 for the shaft 10

of the governor wheel 11. This governor wheel 11 is provided with a rubber tire or tread and is adapted to travel on the record disk.

- 5 On the governor wheel shaft 10 is a worm gear 13 meshing with a worm gear 14 on the governor shaft 15. This governor shaft is journaled in a depending arm 8''' of the bracket 8' and a bracket arm 8'''' projecting at the upper end of the frame 8,—Fig. V. A collar 16 is fixed to the governor shaft 15 and a similar collar 17 is mounted for axial movement and provided with a friction brake disk 18. The blade springs 19 extend between the collars and are provided with governor balls 20.

- A lever-like brake member 21 is pivotally mounted on the frame 8 to coact with the friction disk 18 of the governor. The pivoted brake member is provided with downwardly projecting arm 23 with which the adjusting screw 24 coacts. By adjustment of this screw the brake member 21 may be raised and lowered to regulate the governor.
- 25 The brake member 21 is provided with a friction shoe or engaging member 25 of rubber or other suitable material.

- In operation the governor wheel travels on the surface of the record, thereby driving the governor, which in turn, acts to control the rotation of the governor wheel and thus the travel of the record disk and the surface speed of the record disk is rendered uniform or of constant velocity.

- 35 With this arrangement of parts, records embodying the features of my co-pending application may be effectively reproduced and, as such records have a greater capacity than ordinary records of the same dimensions, the advantages of my improvements will be apparent.

- Inasmuch as the surface speed does not exceed the minimum surface speed of an ordinary record, my improved governor may be employed in connection with the usual governor found in apparatus of this class, so that the instrument may be used for playing either the common type of record or my improved record.

- 50 I have illustrated and described my improvements in but one embodiment. I have not attempted to illustrate or describe various modifications and adaptations which I contemplate, as I believe the disclosure made will enable those skilled in the art to which this invention relates to embody or adapt the same as may be desired.

- Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a structure of the class described, the combination of a driven record turn table, a tone arm supported to swing above said turn table, a governor frame supporting arm pivotally mounted on said tone arm to swing in

a vertical plane and provided with a vertical governor frame journal at its outer end, a yoke-shaped frame journaled thereon, a governor shaft carried by said frame, a governor wheel disposed in alinement with said frame journal and provided with a rubber tread and adapted to travel on the surface of a record disposed on said turn table, a shaft therefor journaled in the arms of said frame and geared to said governor shaft, a governor mechanism on said governor shaft comprising a disk, and a coacting adjustable brake member.

2. In a structure of the class described, the combination of a driven record turn table, a tone arm supported to swing above said turn table, a governor frame supporting arm pivotally mounted on said tone arm to swing in a vertical plane and provided with a vertical governor frame journal at its outer end, a yoke-shaped frame journaled thereon, a governor shaft carried by said frame, a governor wheel disposed in alinement with said frame journal and provided with a rubber tread and adapted to travel on the surface of a record disposed on said turn table, a shaft therefor journaled in the arms of said frame and geared to said governor shaft.

3. In a structure of the class described, the combination of a driven record turn table, a tone arm supported to swing above said turn table, a governor frame pivotally mounted on said tone arm, a governor shaft carried by said frame, a governor wheel adapted to travel on the surface of a record disposed on said turn table, a shaft therefor journaled in said frame and geared to said governor shaft, a governor mechanism on said governor shaft comprising a disk, and a coacting adjustable brake member.

4. In a structure of the class described, the combination of a driven record turn table, a tone arm supported to swing above said turn table, a governor frame pivotally mounted on said tone arm, a governor shaft carried by said frame, a governor wheel adapted to travel on the surface of a record disposed on said turntable, a shaft therefor journaled in said frame and geared to said governor shaft.

5. In a structure of the class described, the combination with a driven turn-table adapted to support a record, of a tone arm adapted to swing above said turn-table, a frame mounted on said tone arm to oscillate in both vertical and horizontal planes, a friction wheel journaled in said frame and adapted to contact with the surface of a record supported upon said turn table, and adjustable governing means for said friction wheel mounted upon said frame.

6. In a structure of the class described, the combination with a driven turn-table adapted to support a record, of a tone arm, a frame mounted on said tone arm, a friction wheel journaled in said frame and adapted

to contact with the surface of a record supported upon said turn-table, and governing means for said friction wheel mounted upon said frame.

5 7. An attachment for phonographs comprising a frame, means for pivotally securing said frame upon the tone arm of a phonograph to oscillate in either a vertical or
10 a horizontal plane, a shaft journaled in said frame, a friction wheel mounted upon said shaft and adapted to contact with the upper surface of a disk record, governing means
15 for said friction wheel mounted on said frame comprising a brake lever and a relatively rotatable brake disk coacting therewith, and means for adjusting said brake lever relative to said brake disk to regulate the speed of said turn-table.

20 8. An attachment for phonographs comprising a frame, means for pivotally securing said frame upon the tone arm of a phonograph to oscillate in either a vertical or a horizontal plane, a shaft journaled in said
25 frame, a friction wheel mounted upon said shaft and adapted to contact with the upper surface of a disk record, and governing means for said friction wheel mounted on said frame.

30 9. A structure of the class described comprising a driven record, a friction wheel mounted to travel on the face of the record, and speed governing means for said friction wheel whereby the speed of the record is controlled.

35 10. In a structure of the class described, the combination of a driven turn table, a

reproducing means comprising a stylus, and means coacting with the record supported on said turn table to maintain the speed of the surface of the record relative to the stylus substantially constant. 40

11. In a structure of the class described, the combination of a driven turn table adapted to receive a record, a reproducing means comprising a stylus coacting with
45 said record, and a speed governing means traveling with said stylus and comprising a friction wheel coacting with the surface of the record.

12. A structure of the class described, comprising a turn-table, driving means for said turn-table, a tone arm supported to swing above said turn-table, a reproducing stylus carried by said tone arm, and a governor means also carried by said tone arm
55 and coacting with the record for maintaining substantially uniform surface speed of the record relative to the stylus.

13. In a structure of the class described, the combination of a driven turn-table
60 adapted to support a record, and a speed governor means comprising a friction governor traveling with the stylus upon the surface of the record.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

JOHN HENRY PHILLIPS, JR. [L. S.]

Witnesses:

F. W. Fox,

F. H. HELMER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE

1,253,317 ----- J. A. Weser,
Patented Jan. 15, 1918,
Filed Jan. 25, 1915.

J. A. WESER, DEC'D.
E. L. WESER, ADMINISTRATRIX.
TALKING MACHINE.

APPLICATION FILED JAN. 25, 1915.

1,253,317.

Patented Jan. 15, 1918.

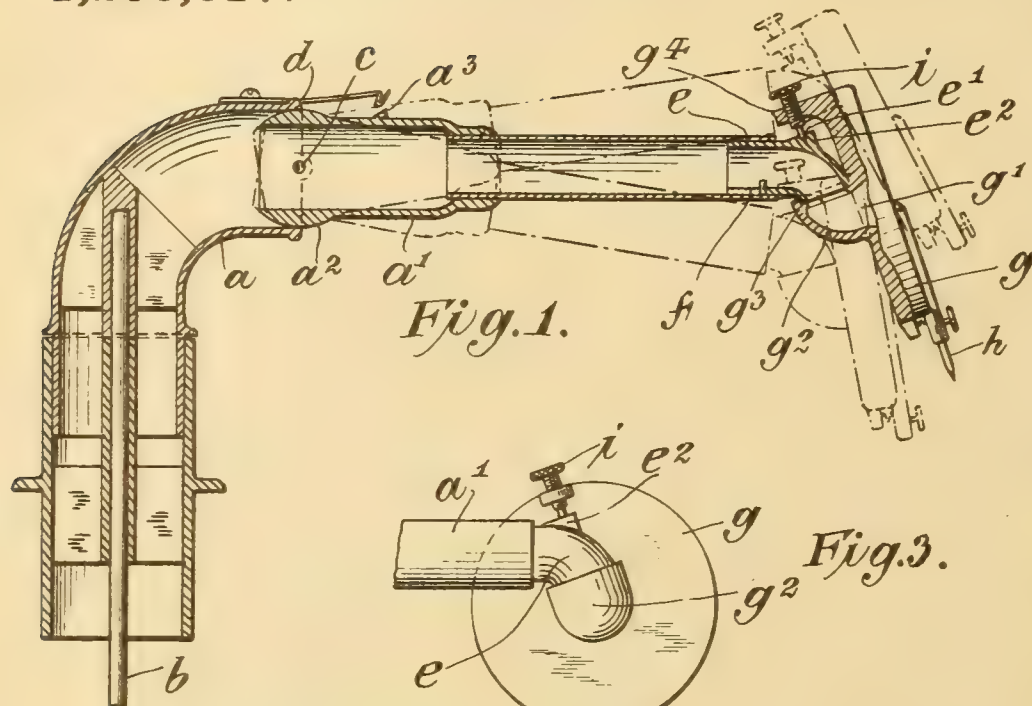


Fig. 1.

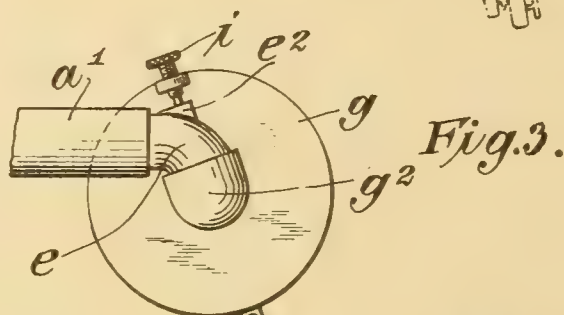


Fig. 3.

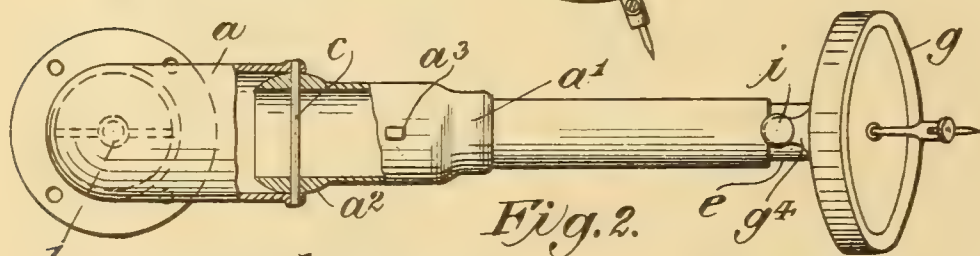


Fig. 2.

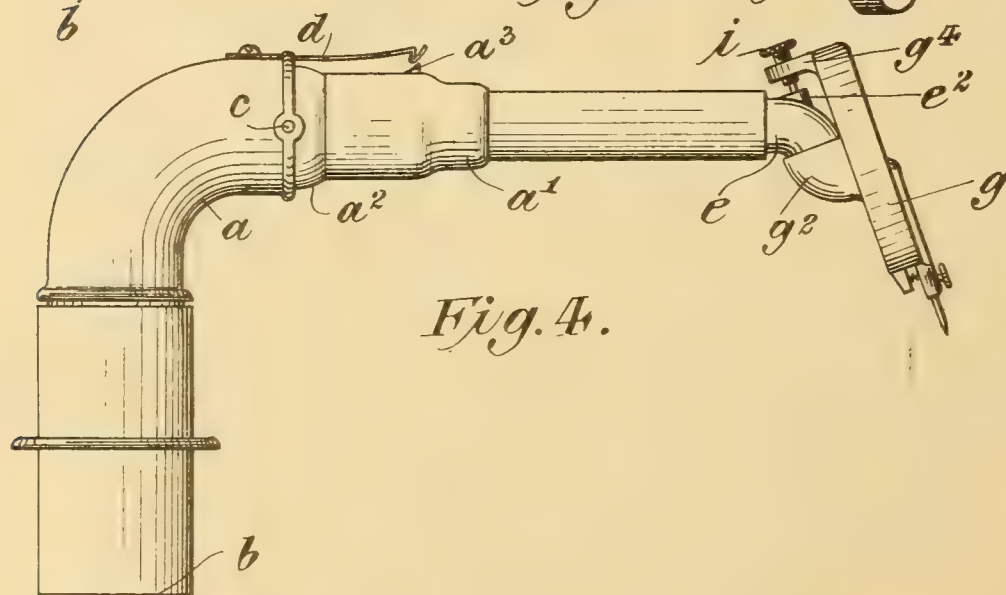


Fig. 4.

WITNESSES

Joseph Schwarz.
Kellie V. Wicks

INVENTOR

John A. Weser
BY
Redding, Greeley, Goodlett
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN A. WESER, OF NEW YORK, N. Y.; ELSIE L. WESER, ADMINISTRATRIX OF SAID
JOHN A. WESER, DECEASED, ASSIGNOR TO WESER BROS. INC., OF NEW YORK, N. Y.,
A CORPORATION OF NEW YORK.

TALKING-MACHINE.

1,253,317.

Specification of Letters Patent:

Patented Jan. 15, 1918.

Application filed January 25, 1915. Serial No. 4,122.

To all whom it may concern:

Be it known that I, JOHN A. WESER, a citizen of the United States, residing in the borough of Manhattan of the city of New York, in the State of New York, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to talking machines and is concerned primarily with graphophones in which disk records are used to vibrate the reproducing diaphragm through the usual needle. For such machines, there are, at present, two popular types of records on the market, in one of which the groove for causing vibrations of the diaphragm is of a uniform depth with respect to the disk but has its sides of irregular outline to cause lateral movements of the needle therein as the groove is moved with respect thereto, while in the other type of disk, the groove is of true spiral form with respect to the disk but is of irregular depth so as to impart vertical movements to the needle with respect to the disk as the record rotates. It has been proposed previously to provide a tone arm and sound box of such construction as to permit the use of the sound box with either of the above described types of records, it being understood, of course, that the direction of vibration of the needle must, at all times, be normal to the plane of the diaphragm. Such known devices, however, usually entail a complete modification of the usual type of tone arm and the construction thereof in several sections interconnected through pivotal joints which permit movement of the sound box through widely divergent planes. Such movement entails a displacement of the needle and the sound box through a very appreciable angle so that such known constructions not only involve the objections of expensiveness of manufacture and multiplicity of parts, but also those of bulkiness and awkwardness in adjustment. The principal object of the present invention is to overcome all of the objections enumerated above and so to construct the tone arm and the sound box and mount the same with respect to each other that the

needle may be quickly and easily positioned with respect to the grooves of the particular type of disk to be played without moving the tone arm and without displacing the sound box bodily with respect to said arm. Another object of the invention is to make it possible to secure such adjustment without modifying appreciably the usual form of tone arm and by making the adjusting devices between the latter and the sound box of simple and inexpensive character. Still another object of the invention is to permit an adjustment of the character described without displacing the needle itself through an appreciable distance, the movement of the sound box with respect to the tone arm taking place about an axis which is nearly co-incident with the axis of the needle. A further object is to improve the construction of tone arms for graphophones by providing a simple and effective pivotal joint therein whereby the outer end of the arm with the sound box may be readily swung in a vertical plane when the needle is lifted from the record. Other objects of the invention will appear hereinafter as this description proceeds, reference now being had to the accompanying drawings for a detailed description of one embodiment of the invention. In these drawings—

Figure 1 is a view, partly in vertical section and partly in elevation, of a tone arm and sound box embodying the invention, the range of movement of the tone arm by reason of the improved joint therein being indicated in dotted lines.

Fig. 2 is a view in plan of the devices illustrated in Fig. 1, part of the tone arm being broken away to show, in horizontal section, the improved joint.

Fig. 3 is a fragmentary view indicating a portion of the tone arm and showing the sound box in a position at 90° to that shown in Figs. 1 and 2 to permit the reproducing of vibrations caused by a laterally undulating groove.

Fig. 4 is a view in side elevation showing the sound box illustrated in Figs. 1 and 2.

The improved tone arm comprises generally a main section *a* formed as an elbow and adapted to have pivotal engagement with any suitable supporting devices, indi-

cated generally at *b*, and a second section *a'*, pivotally secured to the elbow section as through a stud *c* extending transversely thereof and permitting rotation of the section *a'* in a vertical plane only with respect to the elbow section *a*. Between these two sections at the joint described provision is made for preventing entrance of dust or the like, by forming the inner end of the section *a'* with hemispherical bearing surfaces *a*² which rest snugly within the mouth of the elbow section *a* and conform to the curvature thereof. If desired, provision may also be made, in the form of a spring latch *d* carried on the upper face of the elbow *a* and adapted to co-act with a fixed nose *a*³ formed integral with or mounted on the upper face of the second section *a'* of the tone arm, for maintaining this last named section in elevated position with respect to the elbow when the sound box and needle are lifted from the record. The engagement of the latch *d* with the nose *a*³, is, of course, yielding, and the engagement and disengagement therebetween effected readily by pressure on the second section *a'* of the arm.

The outer section *a'* of the tone arm may be formed either in a single piece or may be made up of a plurality of sections as illustrated in the accompanying drawings. For instance, there is indicated, as at *e*, a short removable section intended to be engaged with the straight section *a'* in any suitable manner, as through a bayonet joint, shown at *f*. This short section *e* has its mouth inclined generally downward, say, at an angle of about 70°, and is formed on its upper surface at a point substantially co-incident with the axis of the downwardly extending portion referred to, with a recess *e'* in a knob *e*², for a purpose which will appear later.

The improved sound box *g*, in the preferred form, has its rear wall formed with an opening *g'* and a generally circular flanged mouth *g*² of such outline and dimensions as to receive snugly the mouth *e* of the straight section *a'* of the tone arm. The rear wall of the sound box *g* and the cylindrical mouth *g*² thereon are preferably formed with a continuous shoulder *g*³ against which the lip of the section *e* rests when the tone arm and sound box are in their normal relationship. The rear wall of the sound box *g* is also formed adjacent its periphery and preferably at a point substantially diametrically opposite the needle *h*, with a rearwardly extending bracket *g*⁴ through which passes a thumb screw *i*, the point of which is preferably tapered and rests in the recess *e'* of the bearing *e*² on the short section *e*. From this description it will be evident that when the thumb screw *i* is set up the sound box *g* will be drawn bodily upward so that the lip of the short section *e* will be locked in frictional engagement with the shoulder

*g*³ of the sound box and the parts thereby held against relative movement. In realizing the principal objects of the applicant's invention it is desirable that the thumb screw *i* should have its axis as nearly co-incident with the axis of the needle *h* as possible, and should, at all events, have its axis co-incident with the axis of the downwardly extending mouth of the section *a'* of the tone arm, that is, in the illustrated embodiment, co-incident with the axis of the downwardly extending mouth of the short section *e*. In this way the sound box may be rotated bodily about the pivotal support afforded by the thumb screw *i* from the position shown in full lines in Fig. 1 to a position substantially at right angles with respect thereto, as indicated in Fig. 3. As has been explained before, when the sound box is in the position shown in Figs. 1 and 2 the needle will reproduce vibrations caused by irregularities in depth of a groove of truly spiral form, while, when the sound box is in the position shown in Fig. 3, the needle will reproduce the vibrations of irregularities formed transversely of a groove of uniform depth.

Modifications of the details of construction illustrated in the accompanying drawings may be made, but all such modifications are to be deemed within the scope of this invention provided the general principles of construction and arrangement are followed and the scope of the appended claims not departed from.

I claim as my invention:

1. In a talking machine, the combination of a tone arm including a downwardly inclined section detachably secured to the end thereof, a sound box provided with a lip to receive the mouth of the inclined section, said lip being formed with a shoulder to engage the end of said section, a bearing formed on the upper surface of said section, a bracket carried by the sound box and disposed diametrically opposite the needle, and a pivot screw carried in said bracket and adapted to engage said bearing and maintain the sound box in engagement with the tone arm, the axis of the screw being substantially co-incident with the axis of the inclined portion of the section of the tone arm whereby rotation of the box may be made around said axis.

2. In a sound reproducing machine, the combination of a tone arm provided at its outer end with an elbow, a sound box, a member extending rearwardly from said sound box and rotatably engaged with said elbow, an arm extending outwardly from said sound box over said elbow, and an adjustable screw mounted in said arm and adapted to engage the exterior of said elbow in alinement with the axis of rotation of said member about said elbow, whereby said sound box is at-

tached to said elbow and may be rotated with respect to the elbow through an arc of approximately 90 degrees.

5 3. In a sound reproducing machine, the combination of a tone arm having a downwardly turned outer end, a sound box provided with an upturned elbow shaped to rotatably fit said end of the tone arm, and means disposed entirely outside the sound
10 passage for preventing disengagement of said sound box from said tone arm, said means including a member projecting from said sound box over said end of the tone arm, and a screw carried by said member in
15 position to clampingly engage said outer end of the tone arm.

4. In a sound reproducing machine, the combination of a tone arm having an elbow end, a sound box having an elbow communicating with said end of the tone arm, and
20 means including an extension carried by said sound box and having a clamping screw in position to engage the exterior of said tone arm whereby said sound box is attached
25 to the tone arm so as to be capable of rotative movement relatively thereto.

5. In a sound reproducing machine, the combination of a tone arm provided at one

end with an elbow having an outwardly extending boss, a sound box communicating
30 with said elbow, and means projecting from said box outside of said elbow into position to engage said boss whereby said sound box is held against disengagement from said
35 tone arm but is permitted to rotate about the elbow through an arc of approximately 90 degrees.

6. In a sound reproducing machine, the combination of a tone arm provided with an elbow, a sound box having an extension
40 adapted to be rotatably associated with said elbow, and means for clamping said extension and said elbow together including an arm extending from said sound box upwardly and over said elbow, and a clamping
45 screw carried by the end of said arm in position to engage the crown of said elbow in alinement with the axis of rotation of said extension about said elbow.

This specification signed and witnessed
50 this 23rd day of January, A. D. 1915.

JOHN A. WESER.

Signed in the presence of—

MAX LEVIAN,
W. H. KEATING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

COMBINED GOVERNOR AND SPEED INDICATOR FOR
TALKING MACHINES.

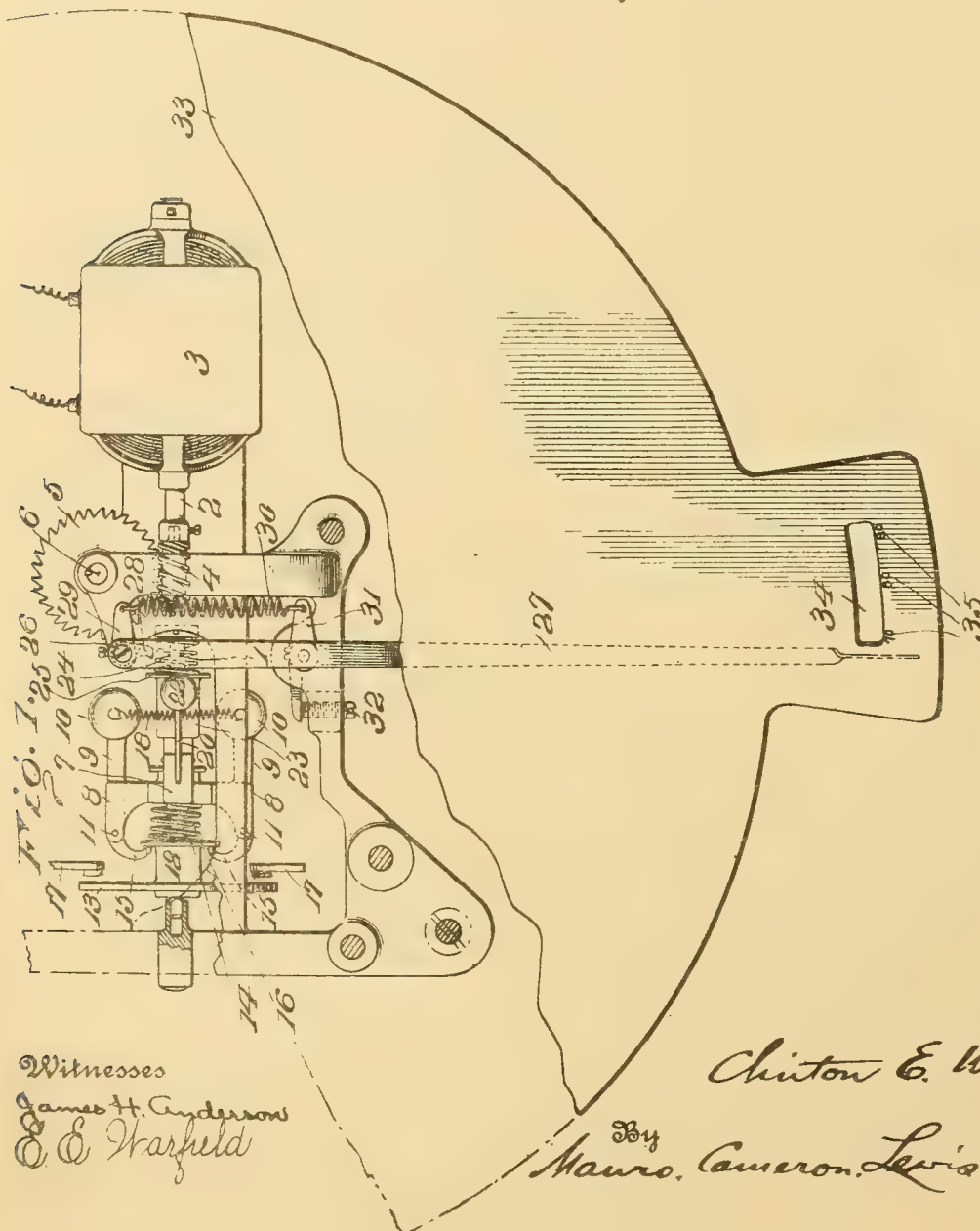
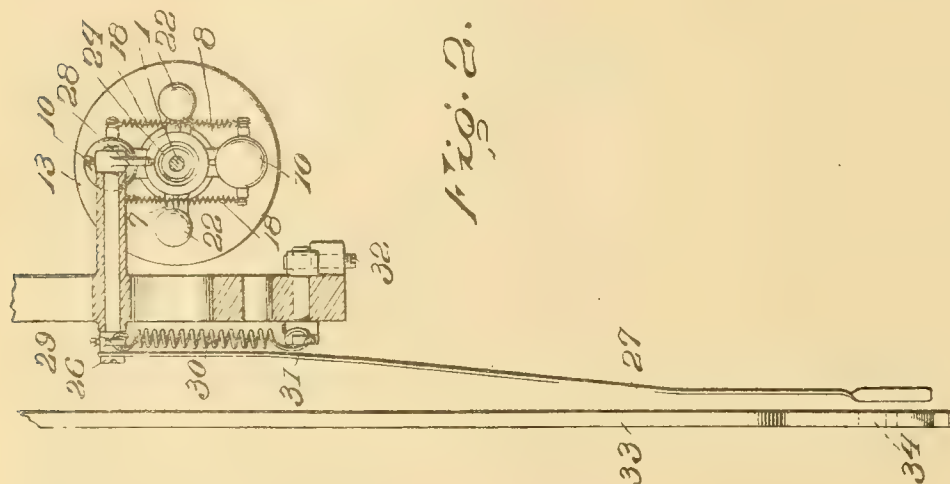
1,253,328 ----- C. F. Woods,
Patented Jan. 15, 1918,
Filed May 29, 1913.

C. E. WOODS.
 COMBINED GOVERNOR AND SPEED INDICATOR FOR TALKING MACHINES.
 APPLICATION FILED MAY 29, 1913.

1,253,328.

Patented Jan. 15, 1918.

3 SHEETS—SHEET 1.



Inventor

Clinton E. Woods.

By Mauro, Cameron, Lewis & Kassie

Attorneys

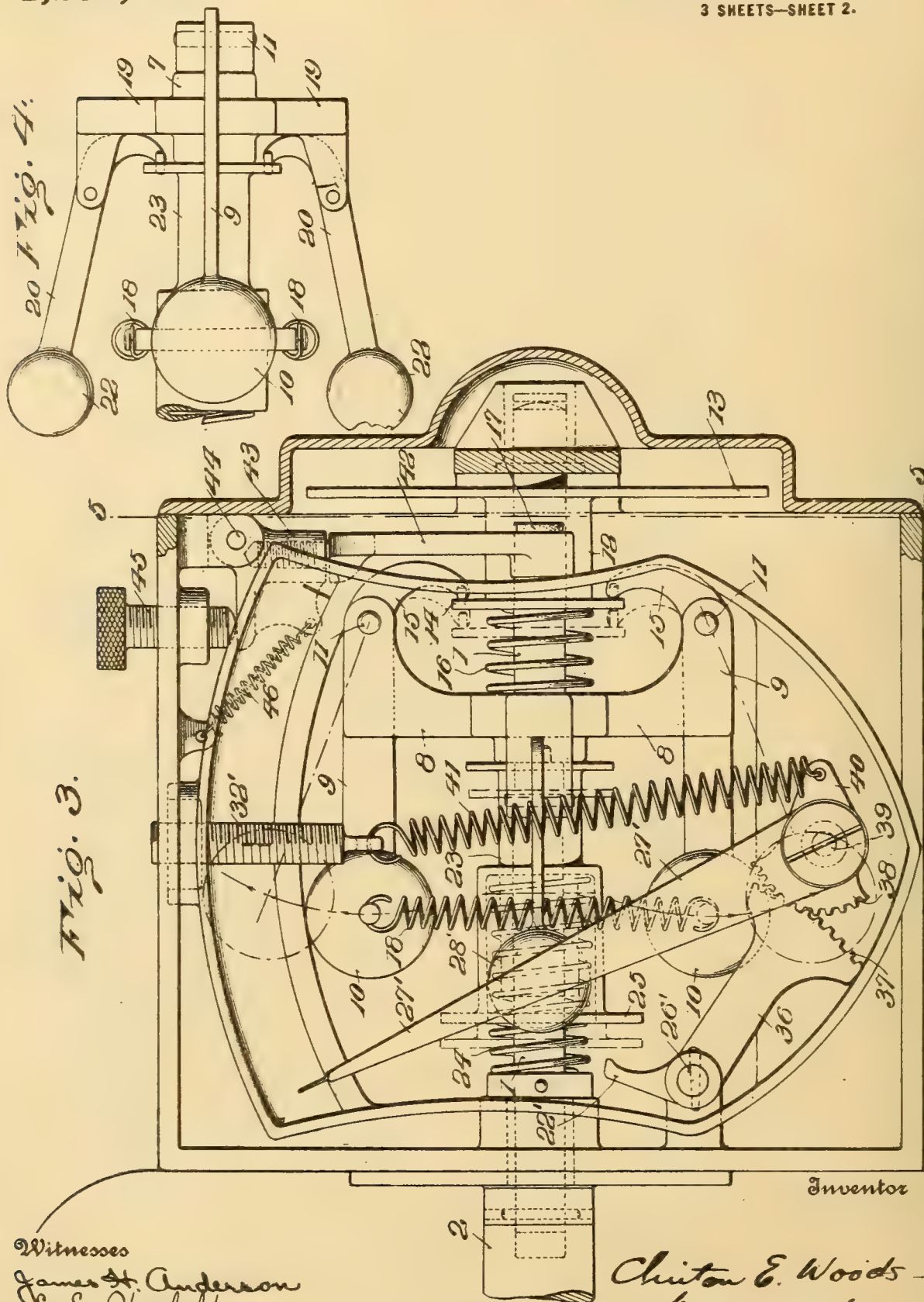
Witnesses

James H. Anderson
 E. E. Warfield

C. E. WOODS.
 COMBINED GOVERNOR AND SPEED INDICATOR FOR TALKING MACHINES.
 APPLICATION FILED MAY 29, 1913.

1,253,328.

Patented Jan. 15, 1918.
 3 SHEETS—SHEET 2.



Witnesses
 James H. Anderson
 E. E. Warfield.

Inventor
 Chilton E. Woods
 by
 Mauro Cameron, Louis A. Cassie
 Attorneys

C. E. WOODS.
 COMBINED GOVERNOR AND SPEED INDICATOR FOR TALKING MACHINES.
 APPLICATION FILED MAY 29, 1913.

1,253,328.

Patented Jan. 15, 1918.

3 SHEETS—SHEET 3.

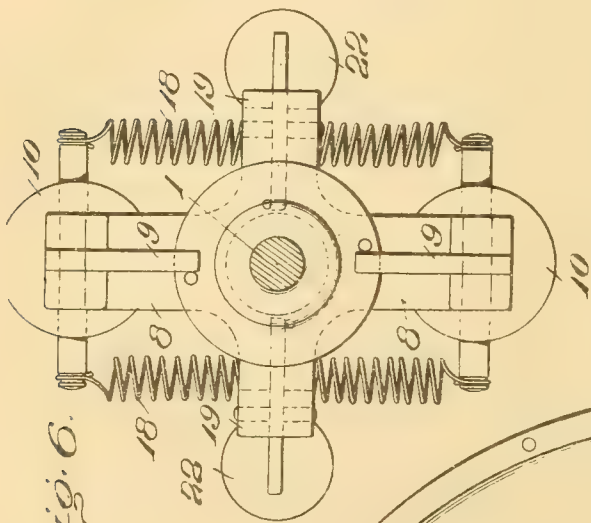


Fig. 6.

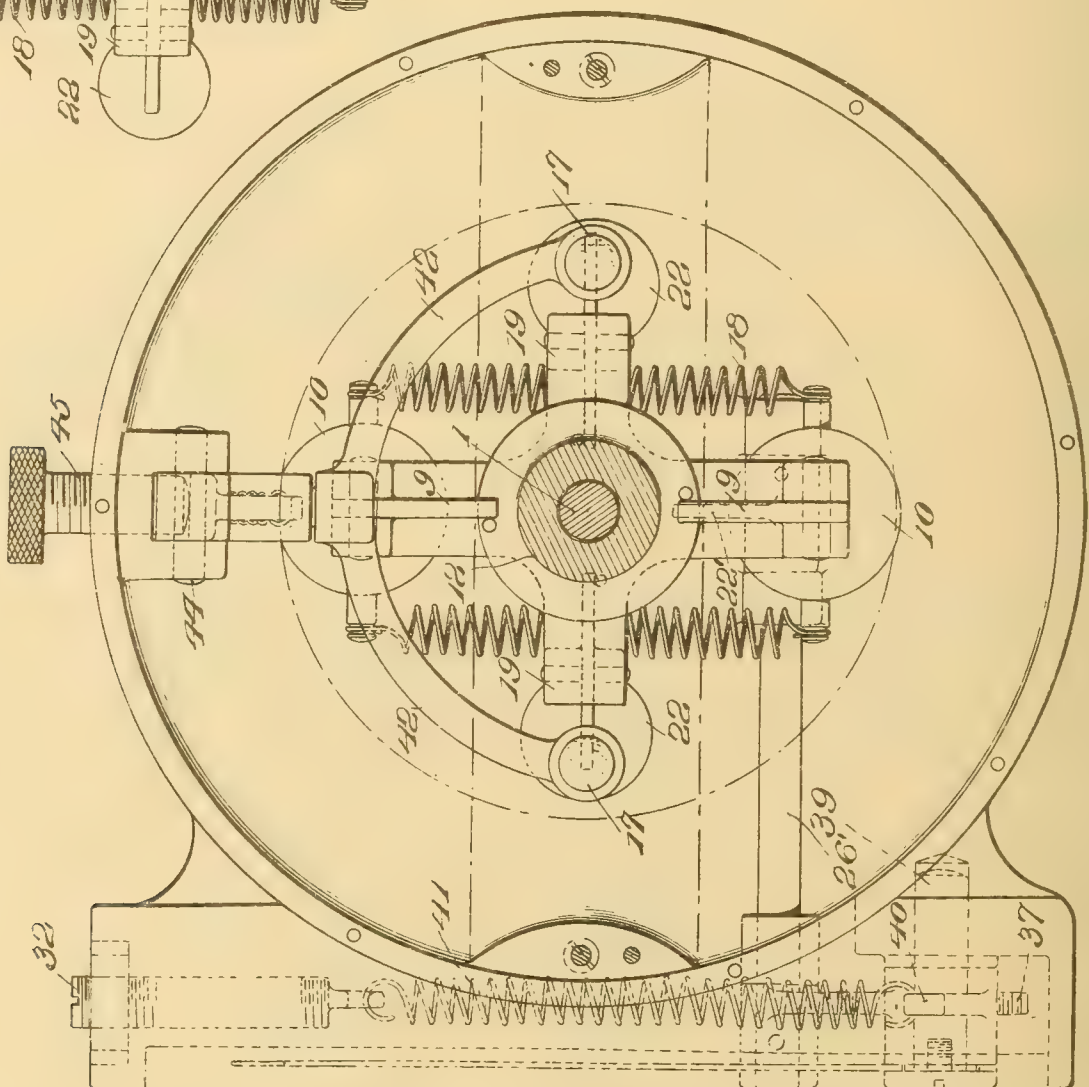


Fig. 7.

Inventor

Witnesses
 James H. Anderson
 E. E. Warfield

C. E. Woods.

By
 Mauro. Cameron, Lewis & Hassie
 Attorneys

UNITED STATES PATENT OFFICE.

CLINTON E. WOODS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO AMERICAN GRAPHOPHONE COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF WEST VIRGINIA.

COMBINED GOVERNOR AND SPEED-INDICATOR FOR TALKING-MACHINES.

1,253,328.

Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed May 29, 1913. Serial No. 770,717.

To all whom it may concern:

Be it known that I, CLINTON E. WOODS, of Bridgeport, Connecticut, have invented a new and useful Combined Governor and Speed-Indicator for Talking-Machines, which invention is fully set forth in the following specification.

This invention relates to talking machines, and more particularly to means for both governing and indicating the speed at which the motor drives (revolves) the record tablet.

In talking machines the pitch of the reproduced sounds depends upon the speed at which the record groove is moved past the reproducing stylus; moreover it is desirable to reproduce the record at approximately the same speed at which the original record is made, since thereby the pitch and tone quality of the original sounds is obtained in the reproduction.

The object of the present invention is to provide means for governing the speed of revolution of the record, combined with means which shall accurately indicate the speed of revolution thereof, and with this object in view, the invention, generally stated, consists in two centrifugally operated means, one of which coacts with a suitable speed regulator, such as a friction device whereby the speed of the motor is controlled, and the other of which operates an indicator or pointer which, in conjunction with a suitable scale, enables the speed of revolution to be accurately determined, thereby rendering it possible for the operator (if the speed at which the original record is made is known) to adjust the speed of the machine to that at which the original record was made; and if the speed of the original record is not known, to so adjust the speed of the motor as to secure the best reproduction both as to pitch and tone quality.

The inventive idea is capable of receiving a variety of mechanical expressions, some of which, for the purpose of illustrating the invention, are shown in the accompanying drawings, but it is to be expressly understood that such drawings are for illustrative purposes only and are not designed to indicate the limits of the invention, reference

being had to the appended claims for that purpose.

In said drawings:—

Figure 1 is a broken plan view of one embodiment of the invention;

Fig. 2 is a broken side elevation of certain of the parts;

Fig. 3 is a side elevation of another embodiment of the invention;

Fig. 4 is a broken detail;

Fig. 5 is a side elevation, partly in section, on the line 5—5 of Fig. 3;

Fig. 6 is a detail.

Referring to the drawings, in which like reference characters indicate like parts throughout the several views, and first to Figs. 1 and 2, 1 is the governor shaft, preferably formed integrally with or otherwise connected to or driven by the driving shaft 2 of any suitable motor, here shown as an electrical motor 3, said driving shaft being provided with a worm 4 actuating the worm gear 5 keyed to the turn-table shaft 6 which drives the turn-table of the machine, which table supports the record. Connected with and preferably mounted upon the shaft 1 is a centrifugal mechanism which preferably comprises two independently acting centrifugal means. The two centrifugal means are so connected to the shaft as to be driven at a fixed speed ratio, which is preferably 1:1, that is, they are driven at the same speed. For mounting and driving the centrifugal means there is preferably provided hub 7 fast on the governor shaft 1 and provided with two diametrically opposite radial arms 8, 8, which arms are slotted to receive bell-crank levers 9, 9, having the weights 10, 10, at one end and pivoted to the arms 8, 8, at the points 11, 11. Also mounted on the governor shaft, so as to turn therewith but to be free to slide thereon, is a sleeve 12 having a friction disk 13 at one end and a flange or lip 14 at the other end, which flange or lip is engaged by the intumed arms 15, 15, of the bell-crank levers 9, 9, the flange 14 being normally held in engagement with the arms 15, 15, by a spring 16 reacting between the left hand end of the hub 7 and the flange 14 on the sleeve 12. Suitable friction pads 17, 17, are mounted in any suitable way ad-

5 adjacent to the right-hand side of the disk 13, and the two centrifugal balls or weights 10, 10, may be, and in some cases are, connected by a suitable spring or springs, one of which 18 is shown in Fig. 1.

10 With the speed-regulator adjusted for full speed, movement of the disk 13 along the shaft while the shaft is rotating at low speeds is resisted only by the spring 16. For higher speeds, however, the movement is resisted by the pads 17—17. The pads come relatively suddenly into action and therefore the resistance to movement of the disk varies widely, the variation being non-15 proportionate to the variation in the rotative speed.

On the hub 7 are two radial arms 19, 19, diametrically opposite to each other and extending at right angles to the arms 8, 8. 20 Mounted in said radial arms are two bell-crank levers 20, 20, shown in Fig. 6, each of said levers being pivoted in slots in the arms 19, 19, in a manner similar to the mounting of the levers 9, 9, in the arms 8, 8. 25 Said bell-crank levers 20, 20, have at their outer ends centrifugal weights 22, 22, and the intumed arms of these levers engage the flanged end of a sleeve 23 mounted to slide upon the governor shaft 1, but being normally held in engagement with the bell-crank levers 20, 20, by a spring 24 reacting against a flange 25 on said sleeve and a suitable abutment at the other end of the spring. 30

35 A rock shaft 26 has an indicator arm or pointer 27 keyed thereto and also a dog 28 projecting into the path of the flange 25 on the sleeve 23. An arm 29 projects from the shaft 26, and is connected by a spring 30 to one end of a lever 31 fulcrumed in the framework of the machine and having an adjusting screw 32 bearing on the other end thereof, by means of which the tension of the spring may be adjusted. 40

45 The motor-board 33 of the machine is situated above the mechanism thus described, and has an indicating scale thereon. Preferably the motor-board is provided with a slot 34 adjacent the outer end of the pointer 27, so that when the pointer is moved, the end thereof moves under the slot 34, and adjacent to said slot there is a speed indicating scale, here shown as indicating the revolutions, seventy, eighty, or 50 ninety per minute, as shown at 35. Any other suitable number of revolutions may be indicated, and the parts adjusted accordingly, but ordinarily the machines are designed to drive the records at a revolution of somewhere between seventy and ninety per minute, and in such case the scale shown in Fig. 1 would be employed. 60

65 The speed-regulator and the speed-indicator are preferably so constructed and connected that they do not normally become op-

erative until a predetermined rotative speed is attained. In the construction illustrated in Fig. 1, the friction pads 17—17 and the dog 28 are, or may be, out of engagement with their respective disks when the mechanism is idle or is rotating at low speeds. 70 It is only when the parts are rotated at higher speeds that the disks 13 and 25 are moved longitudinally to engage the pads and the dog. With this arrangement the minimum of resistance is offered to the rotative movement of the shaft when it is being started, thus permitting the motor to bring the parts quickly to approximately normal speed. As the normal speed is ap- 80 proached, the disk 13 engages the pads 17—17 and the disk 25 engages the dog 28, both the disks and the dog offering some resistance to rotative movement.

From an inspection of Fig. 1, it will be 85 observed that, with the motor and the shaft 2 rotating in a direction necessary to turn the wheel 6 in the usual clockwise direction, there will be a reaction at the worm-and-wheel gearing tending to move the shaft 2 90 toward the right. But it will be observed that the pads 17—17 and the dog 28 press against the disks 13 and 25 respectively on the right-hand side thereof, thus resisting the general tendency of the shaft and the parts carried thereby to move toward the right. It will be seen that, by this arrange- 95 ment, I have utilized the unavoidable pressure at the pads and at the dog to offset the unavoidable pressure resulting from the worm-and-wheel gearing, which would otherwise have to be taken entirely on the thrust bearing. With this arrangement, the thrust bearing is relieved of the major portion of the pressure which it would otherwise carry. 105

Referring to Fig. 3, the dog 28' is shown fast to a rock shaft 26', to which is also keyed an arm 36 having a gear segment 37 on its outer end engaging a segmental gear 38 on a rock shaft 39, to which is keyed the pointer 27'. Said rock shaft 39 also has an arm 40 keyed thereto, and a spring 41 extends between the outer end of said arm 40 and an adjusting screw 32' mounted in the frame of the machine, by means of which 110 the tension of the spring 41, and therefore the position of the indicator arm 27', may be adjusted. 115

The friction pads 17, 17, (see Figs. 3 and 5) are here shown as mounted on the two 120 branches 42, 42, of one arm of a bell-crank lever 43 fulcrumed at 44 and having an adjusting screw 45 mounted to turn in the frame of the machine and bearing on the other arm of said bell-crank lever. A spring 125 46 acts to hold the arm of the bell-crank lever in operative contact with the screw 45. The adjustment of the pads 17 relative to the friction disk 13 is secured by turning the screw 43, as will be readily understood. 130

As has already been pointed out in connection with the construction shown in Figs. 1 and 2, the friction pads and the dog for the speed-indicating mechanism are, or may be, out of engagement with their disks at low speeds, but come into engagement at higher speeds. From the description that has been given, it will be seen that I have provided means whereby the pads can be adjusted to vary the maximum speed at which they are out of engagement with the disks and at which the speed-regulator is inoperative; and that I have provided means whereby the dog 28 can be adjusted to vary the maximum speed at which it is out of engagement with the disk and at which the speed-indicator is inoperative.

Operation: In operation, the hub 7 being keyed to the governor shaft 1 turns therewith and the weights 10, 10, and 22, 22, move outward under the action of centrifugal force, and the friction disk 13 is drawn into contact with the friction pads 17, the speed of the motor being determined by the position of said pads, and the disk 25 is thrown into operative engagement with the dog 28, thereby operating the pointer arm which, in conjunction with the scale, will indicate the speed at which the motor is being driven. By providing two sets of centrifugally operated devices, one of which actuates the speed governor and the other of which actuates the speed indicator, I am enabled to avoid the factor of error which would result if the speed indicator and the speed governor were both actuated by the same centrifugally operated element. Up to the time when the friction disk engages the friction pads to control the speed of the motor, the position of such friction disk would vary relatively to the speed of the motor, but when the disk comes in contact with the pads, it acts to compress the same to a variable degree, and the greater the speed of the motor the greater will the pads be compressed, but the movement of the disk along the governor shaft will not be in proportion to the variations in speed, after the disk comes in contact with the pads. On the other hand, the movement of the disk 25 which actuates the dog 28 whereby the indicator arm or pointer is actuated, has its position controlled by the centrifugally operated balls 22, without the interference of any disturbing element and therefore the position of the disk 25 will vary relatively to and in proportion to the variations in speed, and therefore the position of this disk, which is indicated by the pointer arm and its accompanying scale, is a correct criterion of the speed of the motor.

It will thus be seen that by operating the speed governing mechanism and the speed indicating mechanism by two independent sets of centrifugally operated devices under

the influence of the motor shaft, I am enabled simultaneously to govern or control the speed of the motor and also indicate such speed, and the speed indicator serves as a guide for the operator in adjusting the movements of the speed governor to secure the speed desired.

What I claim is:—

1. In a talking machine, in combination with a turn-table shaft for rotating a sound-record and a motor, a shaft driven by said motor, operative connections between said shafts, a centrifugal device rotated by said driven shaft, brake mechanism operatively connected therewith, a second centrifugal device rotated by said driven shaft and responsive to changes of speed of said first centrifugal device, and a speed indicator operatively connected with said second centrifugal device.

2. In a talking machine, in combination with a turn-table shaft for rotating a sound-record and a motor, a shaft driven by said motor, operative connections between said shafts, a hub carried by said driven shaft, two centrifugal devices mounted on said hub, a brake mechanism operatively connected to one of said centrifugal devices, and a speed indicator operatively connected to the other of said centrifugal devices.

3. In a talking machine, in combination with a turn-table shaft for rotating a sound-record and a motor, a shaft driven by said motor, operative connections between said shafts, a centrifugal speed-governing mechanism mounted on said driven shaft, a second centrifugal device mounted on said driven shaft and responsive to changes of speed of said speed-governing mechanism, and a speed indicator operatively connected with said second centrifugal device independently of said speed-governing mechanism.

4. In a talking machine, in combination with a turn-table shaft for rotating a sound-record and a motor, a shaft driven by said motor, operative connections between said shafts, a sleeve rotating with said driven shaft and movable longitudinally thereon, said sleeve carrying one member of a brake mechanism, a second sleeve rotating with said driven shaft and longitudinally movable thereon, a speed indicator operatively connected with said second sleeve, and two centrifugal devices mounted on said driven shaft, each of said centrifugal devices being operatively related to one of said sleeves.

5. In a talking machine, in combination with a turn-table shaft for rotating a sound-record and a motor, a shaft driven by said motor, operative connections between said shafts, a centrifugal device rotated by said driven shaft, brake mechanism operatively connected therewith, a second centrifugal device rotated by said driven shaft and re-

sponsive to changes of speed of said first centrifugal device; a speed indicator comprising a pointer and a scale, said pointer being operatively connected with said second centrifugal device, and means for adjusting said pointer relatively to said second centrifugal device.

6. In a talking machine, in combination with a turn-table shaft for rotating a sound-record and a motor, a shaft driven by said motor, operative connections between said shafts, a hub carried by said driven shaft, two sets of centrifugal devices independently mounted on said hub, a sleeve at one end of said hub rotating with and movable longitudinally on said driven shaft, a second sleeve at the other end of said hub rotating with and movable longitudinally on said driven shaft, each of said sleeves being operatively related to one of said sets of centrifugal devices whereby it may be moved longitudinally of the driven shaft thereby, brake mechanism associated with one of said sleeves, and a speed indicator operatively connected to the other of said sleeves.

7. In a talking machine, the combination of a driven shaft, a speed-indicating device consisting of a scale and pointer, a centrifugally operated element on said shaft, and operating means comprising two parts respectively connected with said element and said pointer, the said parts being out of engagement at low speeds and in engagement at high speeds.

8. In a talking machine, a driven shaft, a sleeve mounted on said shaft, a centrifugal device imparting longitudinal movement to said sleeve with relation to said shaft, an indicating pointer and scale, a shaft on which said pointer is mounted, and a dog on said shaft projecting into the path of said sleeve, the sleeve being movable in one direction independently of the dog.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CLINTON E. WOODS.

Witnesses:

JOHN R. PETRIE,
J. S. GRIFFITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CENTERING MEANS FOR PHONOGRAPH RECORDS AND THE LIKE.

1,253,374 ----- B. M. Hansen,
Patented Jan. 15, 1918,
Filed Aug. 21, 1916.

B. M. HANSEN.
 CENTERING MEANS FOR PHONOGRAPHIC RECORDS AND THE LIKE.
 APPLICATION FILED AUG. 21, 1916.

1,253,374.

Patented Jan. 15, 1918.

Fig. 1.

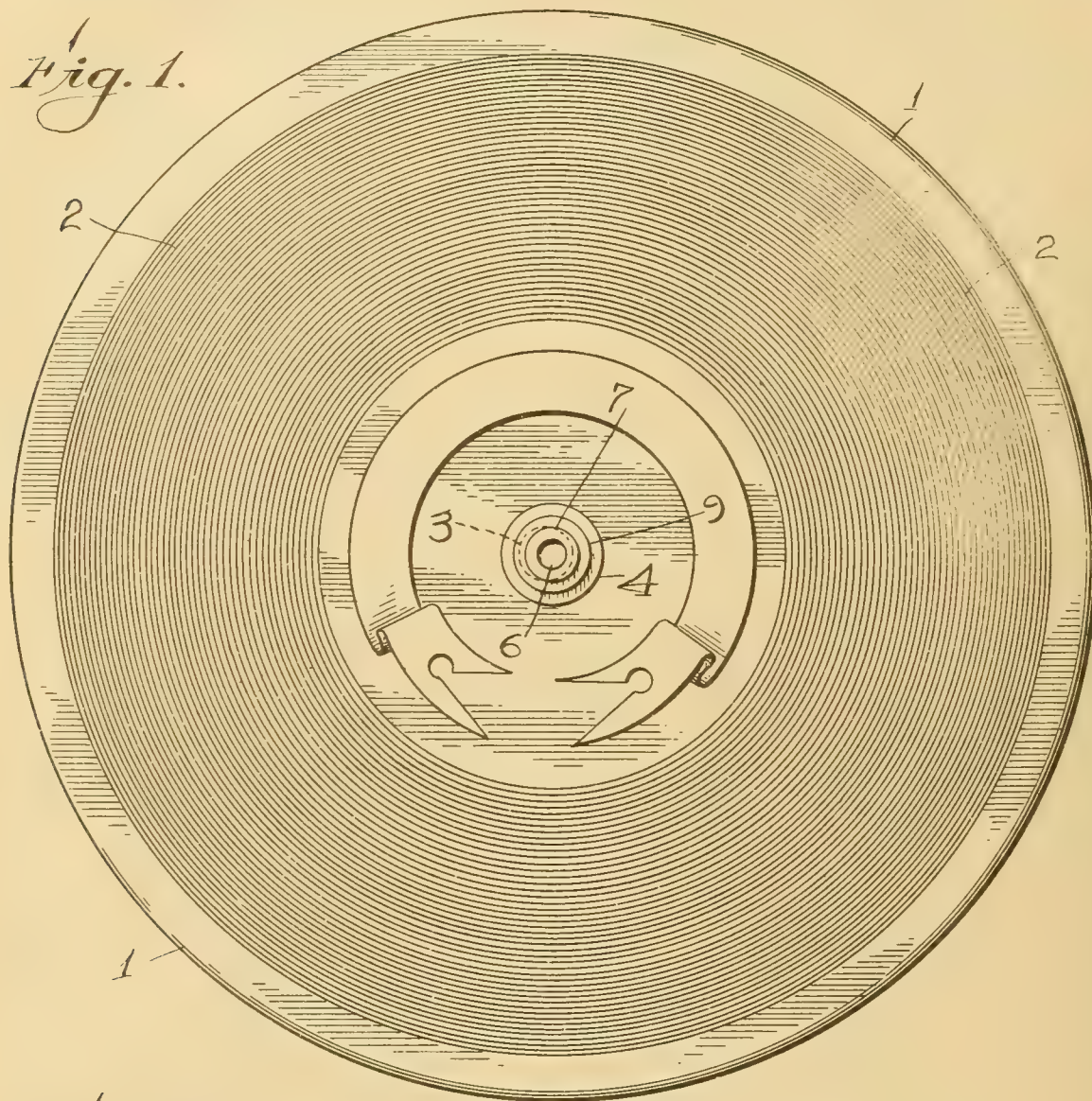
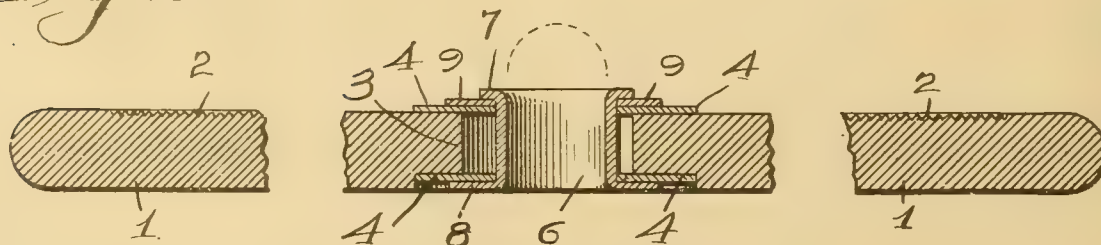


Fig. 2.



Inventor
 Bertram M. Hansen

BY *Arthur L. Lee*

UNITED STATES PATENT OFFICE.

BERTRAM M. HANSEN, OF SAN FRANCISCO, CALIFORNIA.

CENTERING MEANS FOR PHONOGRAPHIC RECORDS AND THE LIKE.

1,253,374.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed August 21, 1916. Serial No. 116,202.

To all whom it may concern:

Be it known that I, BERTRAM M. HANSEN, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented a new and useful Improvement in Centering Means for Phonographic Records and the like, of which the following is a specification.

My invention relates to improved center bearings for phonographic records and the like wherein the aperture is brought concentric with the approximately concentric sound convolutions; and the objects of my invention are:

First, to provide an improved central bearing for phonographic records and the like that shall be adapted to resist wear and thereby prevent the enlargement of the record aperture whereby the alinement of the sound convolutions to the axis of rotation may be preserved.

Second, to provide an improved central bearing or centering means whereby the central aperture of the record may be alined or arranged approximately concentric with the sound convolutions of the record.

Third, to provide improved means adapted to reduce the frictional engagement of a reproducing needle with the record and thereby improve the harmony of the selection being rendered.

Fourth, to provide improved means whereby the wear on the sound or impression convolutions or grooves may be eliminated.

I accomplish these and other objects by means of the device disclosed in the drawings forming a part of the present specification wherein like characters of reference are used to designate similar parts throughout the said specification and drawings, and in which—

Figure 1 is a plan view of a phonographic record disclosing my invention applied thereto.

Fig. 2 is an enlarged broken transverse sectional view of a record disclosing more fully in detail the construction and arrangement of my invention.

Referring to the drawings the numeral 1 is used to designate a phonographic record having the usual sound impressions or convolutions 2 arranged approximately concentric with said record 1. Notwithstanding that the said convolutions 2 are spiral, being continuous, the term concentric is applied thereto in an illustrative sense for the

reason that the pitch of said spirals is so small in proportion to the diameter of the disk 1 that said convolutions 2 may be said to be approximately concentric.

The disk 1 is provided with the usual approximately central aperture 3 which is provided by the simple process of boring or punching through the approximate center of the disk 1.

In practice it seems to be a rather difficult matter to form the aperture 3 absolutely central to the convolutions 2 and the result is that when the record 1 is rotated for reproducing, the reproducing needle, not shown, instead of having a constant speed in one direction, viz.: toward the center of the disk as is the practice, that a wavering or approximately reciprocating movement is imparted to the needle and box with the result that the said needle is forced alternately against opposite sides of the V-shaped sound convolutions or grooves 2 thereby producing an undue friction which tends to increase the hissing or metallic sound which is generally magnified by the reproducer to the detriment of the harmony of the selection being rendered.

I eliminate or reduce this friction and thereby not only improve the harmony of the selection being rendered but also eliminate the wear on the sides of the convolutions 2 and also the aperture through the softer material of the record by means of the metallic centering means which may be described as follows:

Washers 4 are arranged on each side of the record 1 and adjacent to the aperture 3 therein. These washers 4 may be arranged on the top of the record 1 as disclosed in the upper central portion of Fig. 2 of the drawings, or the record adjacent the said aperture 3 may be countersunk so that the said washers may lie flush with the surface of the record 1 as disclosed in the lower central portion of the figure referred to.

A metallic gromet or sleeve 6 is provided with annular flanges 7 and 8, the flange 8 being larger in diameter than the flange 7 and arranged to engage the outer surface of the lower washer 4 in Fig. 2 of the drawings. The smaller flange 7 of the gromet or sleeve 6 is engaged by a third washer 9 provided for the purpose of providing greater stability to the entire construction when assembled.

Before the smaller annular flange 7 is

spun, punched or otherwise impressed onto the third washer 9 the bore sleeve 6 is alined concentric with the convolutions 2 of the disk 1, thereby eliminating the wavering motion which tends to increase the frictional engagement of the reproducing needle, thereby eliminating wear on the side of the groove.

When said alinement has been accomplished in any suitable manner the flange 7 of the gromet or sleeve 6 is tightly impressed onto the third washer 9 so as to tightly and rigidly secure the entire structure to the disk 1 thereby retaining said alinement.

It is obvious from the foregoing that I have provided an improved centering means for phonographic records and the like wherein the harmony of the selection may be improved as well as means whereby wearing of the centering aperture and grooves may be prevented.

I am aware that the present state of the art discloses gromets of various designs ap-

plied to various uses; I do not therefore claim the broad principle of the gromet, but what I do claim as new and desire to secure by Letters Patent is—

The combination with a centrally apertured phonographic record having the usual convolutions thereon, of a metallic gromet comprising a circular washer arranged on each side of the record; a metallic sleeve having an annular flange on each end thereof one of said flanges being of larger diameter than the other and arranged to engage one of the washers; and a third washer arranged to engage the remaining washer and to be in turn engaged by the smaller flange on the end of the sleeve whereby said sleeve may be secured within the central aperture and concentric with the convolutions of the disk.

In witness whereof I hereunto set my signature.

BERTRAM M. HANSEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

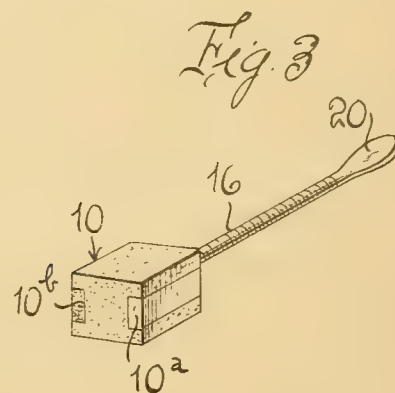
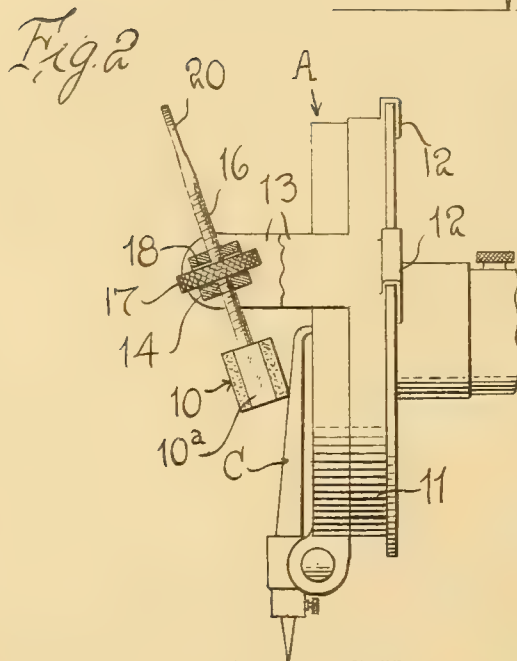
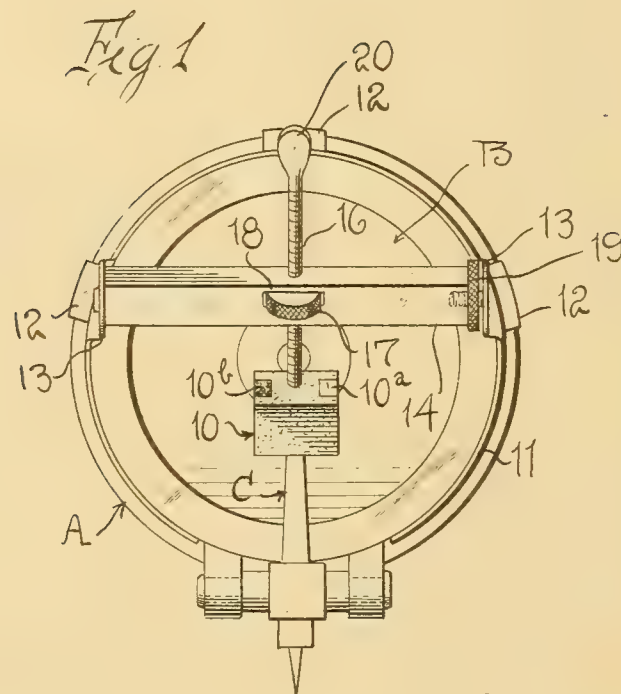
SOUND MODIFIER FOR PHONOGRAPHS.

1,253,407 ----- P. MacA. MacCaskie,
Patented Jan. 15, 1918.
Filed Sept. 7, 1916,
Renewed Dec. 10, 1917.

P. MACA. MACCASKIE.
 SOUND MODIFIER FOR PHONOGRAPHS.
 APPLICATION FILED SEPT. 7, 1916. RENEWED DEC. 10, 1917.

1,253,407.

Patented Jan. 15, 1918.



Inventor

P. M. MACCASKIE

By *Watson E. Coleman*
 Attorney

UNITED STATES PATENT OFFICE.

PETER MACALLISTER MACCASKIE, OF HOT SPRINGS, TERRITORY OF ALASKA.

SOUND-MODIFIER FOR PHONOGRAPHS.

1,253,407.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed September 7, 1916, Serial No. 118,869. Renewed December 10, 1917. Serial No. 206,545.

To all whom it may concern:

Be it known that I, PETER MACA MACCASKIE, a citizen of the United States, residing at Hot Springs, Territory of Alaska, have invented certain new and useful Improvements in Sound-Modifiers for Phonographs, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to phonograph sound boxes and particularly to means for regulating or modifying and thereby improving the tone of a phonograph without the necessity of changing the needles.

15 The general object of my invention is the provision of a device of this character which is adapted to be detachably mounted upon any ordinary sound box and be therefore applicable to a large number of different phonographs.

20 A further object of the invention is to provide a device of this character which has a tone modifying element which may be applied to the stylus arm or lever at various points therealong so as to dampen, modify or soften the vibrations of the diaphragm and thus achieve the same object as is achieved by changing the needles or styli from hard needles to medium and soft needles.

25 A further object of the invention in this connection is to provide a dampening or modifying member composed of a combination of different substances disposed in such relation to each other that the modifying member may be shifted to bring any one of the different substances into engagement with a stylus arm, to thus variously modify the action of the stylus arm.

30 A further object of the invention is to provide means whereby the tone modifying element may be pressed with greater or less force against the stylus arm.

35 Still another object is to provide a shifting tone modifying element, shiftable not only into various positions relative to the stylus arm itself, but also into various positions with relation to the diaphragm.

40 Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a face view of the sound box provided with my attachment;

Fig. 2 is a side view of the sound box provided with my attachment, the cross bar 14 being in section; and

Fig. 3 is a perspective view of the sound modifying member and rod 16.

Referring to these figures, A designates the usual sound box of a sound reproducing machine, and B designates the diaphragm, while C designates the stylus arm or stylus supporting lever mounted in the usual manner and which transfers the vibrations of the record tablet to the diaphragm B. These parts, of course, are those commonly found on phonographs and form no part of my invention.

45 My invention consists in the provision of a sound modifying or controlling member which may be disposed against and engages with the stylus arm, and as illustrated, this member which is designated 10, is cubical in form and is made of rubber or composition having an insert 10^a of metal on one of its faces and an insert 10^b of wood, for instance, on another face. While I have illustrated a cubical member having two inserts, it will be understood that this member 10 may have any desired or necessary form as hexagonal or octagonal and may have a large number of different inserts, the inserts being of different materials. Preferably, however, the member 10 has a plurality of flat faces so that each face but one may carry an insert, one face however, having no insert so that the material of the member 10 itself may contact with the arm C.

50 For the purpose of supporting the member 10 in position for adjustment, I preferably provide a clip 11 which is made of resilient material and adapted to spring into place upon a sound box, this clip 11 being provided with inwardly extending lugs which will embrace the edge of the sound box. This clip 11 at diametrically opposite points is provided with outwardly extending arms 13, between the upper ends of which is pivoted the cross bar 14. This

cross bar at its middle is transversely perforated and through this perforation or aperture passes a rod 16 which at its inner end is connected to or engaged with the modifying member 10. Preferably this rod 16, intermediate its ends, is screw-threaded for engagement with a nut 17 which is disposed in a slit 18 formed in the cross bar 14, the nut projecting beyond the edges of this bar 14 so that it may be readily manipulated by the fingers. By turning this nut in one direction or the other, the rod 16 will be longitudinally shifted. The cross bar 14 is also held in its adjusted positions by any suitable device and to this end one of the arms 13 is formed with an inwardly projecting gudgeon 31 which extends into the bar 14, this gudgeon being screw-threaded and carrying a nut 19. When this nut is turned up it will bind upon the arm 14 and holds this arm in its adjusted positions. The outer extremity of the rod 16 is provided with a finger piece 20 whereby the rod may be rotated.

In the practical use of my invention a "full tone" needle or stylus is used which is designed to produce the full tone as originally sung or played. When it is desired that this full tone shall be reproduced the modifying member 10 is shifted so as to be entirely out of engagement with the diaphragm or the stylus arm C. If, however, it be desirable to soften this tone or otherwise modify it, the modifying member 10 is brought into contact with the arm C, preferably at the point of juncture of the arm C with the diaphragm. The sound will be accordingly modified depending upon the particular insert which is brought in contact with the stylus or needle arm, and depending upon the degree of pressure with which the modifying element is urged against the diaphragm or stylus arm. While I have found that the best results are secured by bringing the modifying elements against the stylus arm at its juncture with the stylus arm, yet it is obvious that the modifying element may be disposed against any portion of the arm or against any portion of the diaphragm so as to secure the best results in modifying the vibrations of the diaphragm.

The adjustment of the sound modifying member against the diaphragm is secured by rotating the clip 11 upon the sound box to such a degree that the screw threaded rod 16 will extend down at an angle to the plane of the stylus arm C and then rotating the nut 17 until the sound modifying member 10 is brought into firm contact with the diaphragm. When the sound modifying member is brought into firm contact with the diaphragm the rotation of the cross bar 14 may be prevented and the sound modifying member held in firm engagement with

the diaphragm by screwing down the nut 19 until the cross bar is firmly held in its adjusted position.

By the use of my device the phonograph or other sound reproducing machine will produce any volume of tone required not to exceed the full tone of the needle. Any tone or pitch required will be produced to suit the operator and the modifier can be brought into contact with any part or portion of the needle arm or diaphragm.

I have illustrated the modifier as composed of three different materials which will produce as many different volumes of sounds. Though I have only illustrated three different materials combined in the modifier, I do not wish to confine myself to any specified combination of compounds and metals. Neither do I wish to confine myself to any particular form or shape of modifier as this may be varied within wide limits without departing from the spirit of the invention. It is obvious that with my device it is not necessary to change the needles until they become worn out and that my modifying device gives a complete musical control. While

I have illustrated the sound modifying member as applied to the stylus carrying arm C, I have done this so that the construction may be clearly illustrated, but in actual practice the best results have been secured by applying the sound modifying member 10 to the arm C at its juncture with the diaphragm.

Having described my invention, what I claim is:

1. The combination with a diaphragm and a stylus supporting arm, of a sound modifying device including a sound modifying member composed of elements of different materials disposed to form a plurality of faces, the modifying member being mounted to bring any one of said faces and thereby any one of said elements into contact with the diaphragm or the stylus arm.

2. The combination with a sound box, a diaphragm and a stylus supporting arm, of a tone modifying device operatively mounted in connection with the sound box and including a tone modifying member shiftable into engagement with the diaphragm or the stylus supporting arm, said tone modifier being composed of different materials and being shiftable to bring any one of said materials into contact with the diaphragm or arm.

3. The combination with a diaphragm, and a stylus supporting arm, of a sound modifying device including a sound modifying member having inserts of different materials, the modifying member being mounted to bring any one of said inserts into contact with the diaphragm or the stylus arm.

4. The combination with a diaphragm, and

a stylus supporting arm, of a rotatably mounted bar operatively supported in connection with the diaphragm, a rod rotatably mounted in and longitudinally shiftable 5 through the bar, and a sound modifying member mounted upon the inner end of said rod.

5. The combination with a sound box, a diaphragm, and a stylus supporting arm, of 10 a cross bar rotatably mounted in conjunction with the sound box, a rod passing through the cross bar and adjustable rotatably and longitudinally therein, and a sound modifying member carried on the end of said 15 rod having a plurality of faces, certain of said faces being provided with inserts of different materials adapted to be brought in contact with the diaphragm or the stylus carrying arm.

20 6. The combination with a sound box, a diaphragm, and a stylus supporting arm, of supporting members operatively connected to the sound box extending out therefrom, a cross bar rotatably adjustable upon 25 the supporting members, a rod extending through the cross bar and rotatable and

longitudinally movable therethrough, a nut mounted on the cross bar having screw-threaded engagement with the rod, and a sound modifying element mounted on the 30 rod.

7. An attachment for phonographs comprising a clip adapted to be engaged with a sound box, said clip having supporting 35 arms extending therefrom, a cross bar mounted on the supporting arms, and a sound modifying member having a plurality of sound modifying faces and operatively supported on the cross bar for rotational and longitudinal adjustment. 40

8. The combination with a sound box, a diaphragm and a stylus carrying member, of a damper operatively supported upon the sound box and adjustable into contact with the different portions of the diaphragm or 45 with the needle supporting arm.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

PETER MACALLISTER MACCASKIE.

Witnesses:

J. LAUDERS,

Mrs. W. T. BARR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

BRAKE.

1,253,475 ----- J. H. Dickinson,
Patented Jan. 15, 1918,
Filed Jan. 29, 1915.

J. H. DICKINSON.
BRAKE.
APPLICATION FILED JAN. 29, 1915.

1,253,475.

Patented Jan. 15, 1918.

Fig. 1.

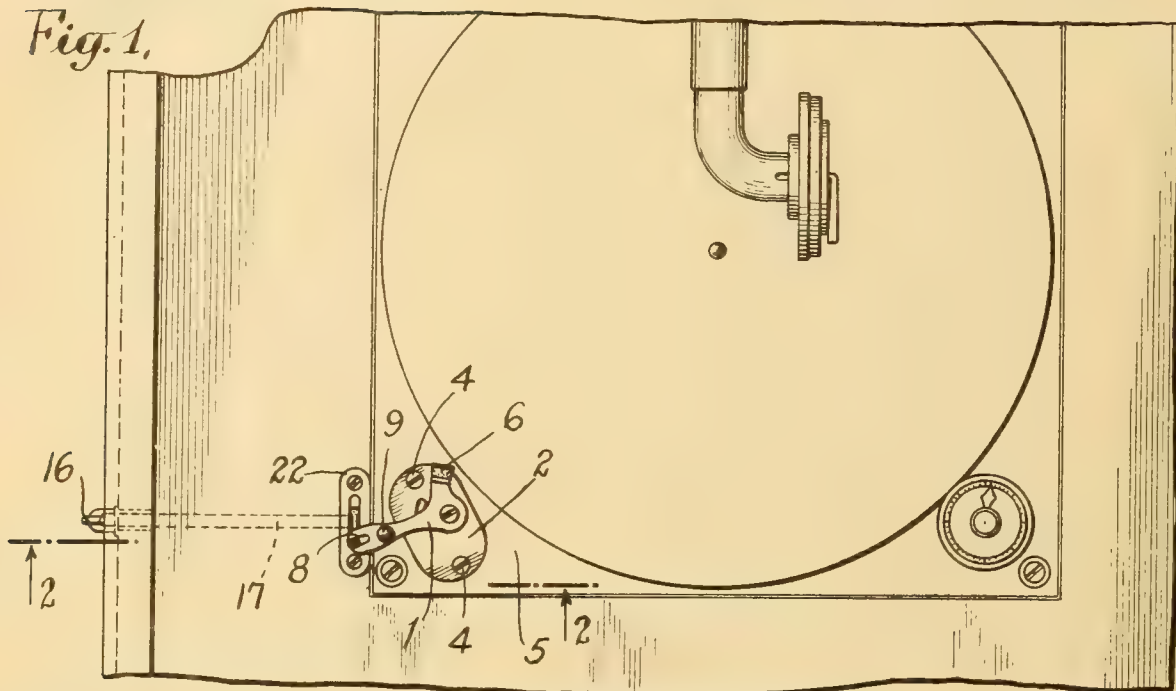


Fig. 2.

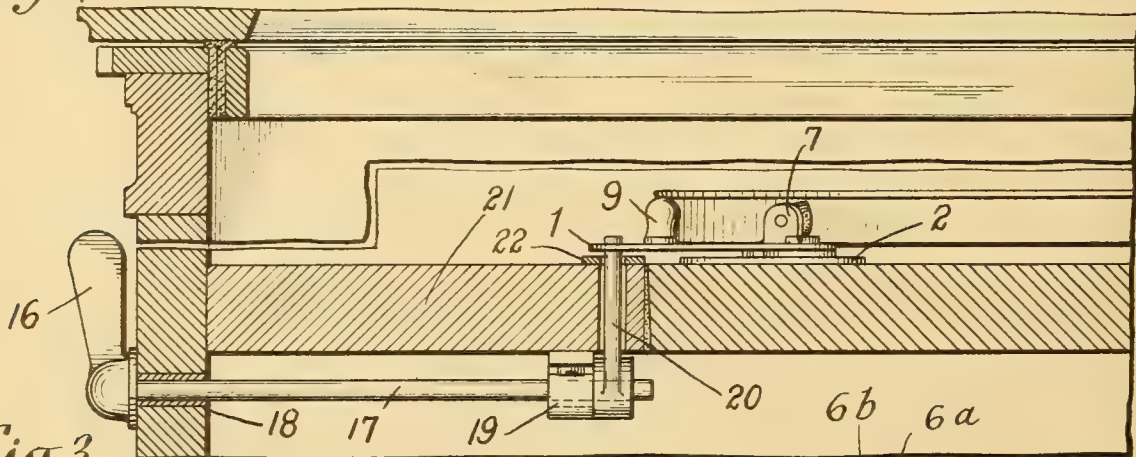


Fig. 3.

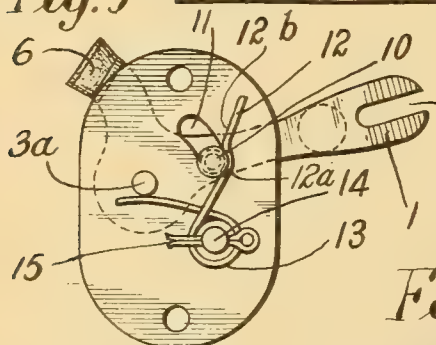


Fig. 4.

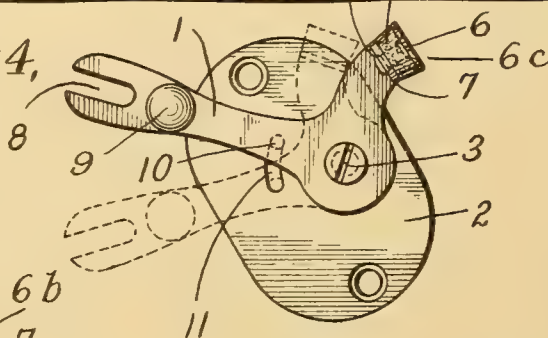
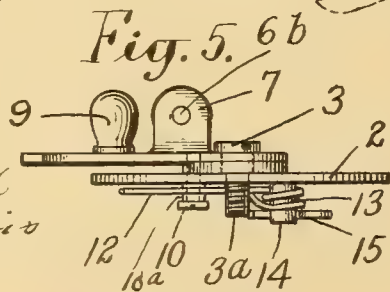


Fig. 5.



WITNESSES:

C. W. Brindley
J. F. Dickinson

INVENTOR

Joseph Hunter Dickinson

BY

Ed. Cherry
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEPH HUNTER DICKINSON, OF CRANFORD, NEW JERSEY, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

BRAKE.

1,253,475.

Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed January 29, 1915. Serial No. 5,045.

To all whom it may concern:

Be it known that I, JOSEPH H. DICKINSON, a citizen of the United States, residing at Cranford, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Brakes, of which the following is a specification.

My invention relates to an improved brake more particularly adapted for use in phonographs and the like. Its features and advantages will be apparent to those skilled in the art from an understanding of the following description in connection with the drawings. In the latter, Figure 1 is a fragmentary top plan view of a talking machine embodying the present brake; Fig. 2 is an enlarged vertical section partly in elevation on the line 2—2 in Fig. 1 looking in the direction of the arrows; Fig. 3 is an underneath plan of the brake detached; Fig. 4 is a top plan of the same; and Fig. 5 is a side elevation looking at Fig. 4 from the left.

Describing now the devices of the drawings, 1 is an elbow lever pivoted to a base plate 2 by screw 3. The plate is secured by screws 4 as a cover over a recess (not shown) formed in the board 5, the recess being provided to receive the projecting underneath parts of the device. 6 is a brake-shoe for contacting with the periphery of the turn-table and is appropriately mounted on the upstanding end 7 of one arm of the elbow-lever 1 (compare Fig. 5). The other arm of this lever is notched at 8 and has a knob 9 by which to operate it. Intermediate the handle 9 and the pivot 3, said lever arm has a downwardly projecting pin 10 working in a slot 11 in the plate. The pin is headed on the underside of the plate and there has the arm 12 of a spring 13 bearing against it (Fig. 3). This spring consists of a piece of spring wire coiled about a pin 14 on which it is upheld by the cotter-pin 15. The two free ends or arms of the spring are crossed (Fig. 3) and held spaced apart under tension, one arm by the end 3^a of the pivot screw 3, and the other arm 12 by the above described pin 10 on the handle arm of the elbow brake-lever. This spring arm 12 is bent in such a way as to form a notch or recess in it at 12^a which produces a locking effect on the pin 10 (Fig. 3) so that the latter is maintained stationarily at one end of the slot 11 with the brake-shoe 6 in "off", or unbraking position. Further, this spring

arm 12 is bent so that its end portion 12^b has a cam action on the pin 10 as soon as it is released from the locking effect of the notch, recess or bend 12^a; and this cam action forces said pin toward the opposite end of the slot 11 and forces the elbow lever 1 into its position shown by the full lines in Fig. 4.

Thus if the brake be in "on" position shown by the full lines in Fig. 4, it is released by operating its handle or notched end into the dotted position whereupon the notch 12^a in the spring-arm locks it by means of the pin 10 in "off" position. Vice versa to apply the brake, it is merely necessary to press the handle end of the lever in the direction of the full lines sufficiently to force the pin 10 out of locking engagement with the spring-arm 12, whereupon the brake-lever is tripped and said spring-arm completes the motion of the elbow lever by camming it into its braking position shown by the full lines in Fig. 4.

The brake can also be operated from the outside of the cabinet by swinging a small crank arm or finger piece 16 on the end of a rock-shaft 17 whose bearings are at 18 and 19 respectively and which has an inner crank arm 20 projecting up through a slot in the shelf 21 and in the escutcheon plate 22 into the notch 8 in the end of the elbow lever. In short the brake can be applied or released from the outside of the case by swinging the finger piece 16 in one direction or the other, as well as from the inside by operating it through the knob 9.

An anti-friction bearing may be provided between the spring-arm 12 and the pin 10, comprising a loose sleeve 10^a on the pin 10 to be in rolling contact with said spring-arm.

The shoe 6 consists of a piece of material 6^a such as leather (Fig. 4) secured by a rivet 6^b to the upstanding end 7 of the elbow-lever and further comprises a piece of leather 6^c glued as a facing to the piece 6^a.

What I claim is:—

1. In a brake mechanism, the combination of a brake member movable between an "off" position and an "on" position, and provided with a rigid projection; and spring means coöperative with the brake member, having a notch directly engageable with said projection to lock said member in one position, and also having a cam portion adapted to

wipe against said projection, when the latter is released from said notch, so as to force said member into its other position.

2. In a brake mechanism, the combination of a brake member movable between an "off" position and an "on" position, and provided with a rigid projection; and a spring, constituting the sole means for throwing said member from one of such positions to the other bent to form a notch directly engageable with said projection to lock said member in one position, and also to form a cam portion adjacent said notch adapted to wipe against said projection, when the latter is released from the notch, so as to force said member into its other position.

3. In a brake mechanism, the combination of a two-armed brake lever movable between an "off" position and an "on" position and having a braking part on one arm, and a lateral projection on the other arm; a plate whereon said lever is pivoted, having a slot in which said projection is arranged to travel; and spring means coöperative with the brake member, having a notch directly engageable with said projection to lock said member in one position, and also having a cam portion adapted to wipe against said projection, when the latter is released from said notch, so as to force said member into its other position; one end of said slot limiting the "on" movement of said lever, and the other end limiting its "off" movement in position for the automatic engagement of said projection by said notch.

4. In a brake mechanism, the combination of a two-armed brake lever movable between an "off" position and an "on" position and having a braking part on one arm, and a lateral projection on the other arm; a plate whereon said lever is pivoted; and spring means coöperative with the brake member, having a notch directly engageable with said projection to lock said member in one position, and also having a cam portion adapted to wipe against said projection, when the latter is released from said notch,

so as to force said member into its other position; means being provided for arresting the "off" movement of said lever in position for the automatic engagement of said projection by said notch.

5. In a brake mechanism, the combination of an angular brake lever movable between an "off" position and an "on" position, and having a braking part on one arm, and a lateral projection on the other arm; a plate whereon said lever is pivoted; a fixed projection on said plate; and a strip of spring wire having its middle portion coiled about said fixed projection and its extremities or legs crossed under tension; one of said legs being held fixed, and the other bent to form a notch for direct engagement with the first-named projection to lock the lever in one position, and also to form a cam portion adjacent said notch adapted to wipe against said first-named projection, when the latter is released from the notch, so as to force said lever into its other position.

6. In a brake mechanism, the combination of a brake member movable between an "off" position and an "on" position and provided with a rigid projection; spring means coöperative with the brake member, having a notch directly engageable with said projection to lock said member in "off" position, and also having a cam portion adapted to wipe against said projection, when the latter is released from said notch, so as to force said member into its "on" position; and means connected to positively impart an initial movement to said brake member with relation to said spring means, to effect the release of said projection from said notch.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 27th day of January, 1915.

JOSEPH HUNTER DICKINSON.

Witnesses:

J. F. MEADE,

E. W. SCHERR, Jr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND BOX.

1,253,527 ----- R. J. Prettie,
Patented Jan. 15, 1918,
Filed Jan. 26, 1915.

1,253,527.

Patented Jan. 15, 1918.

Fig. 1,

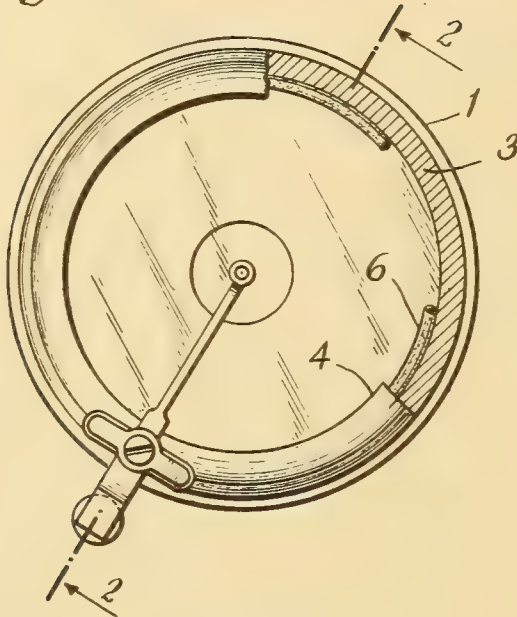


Fig. 2,

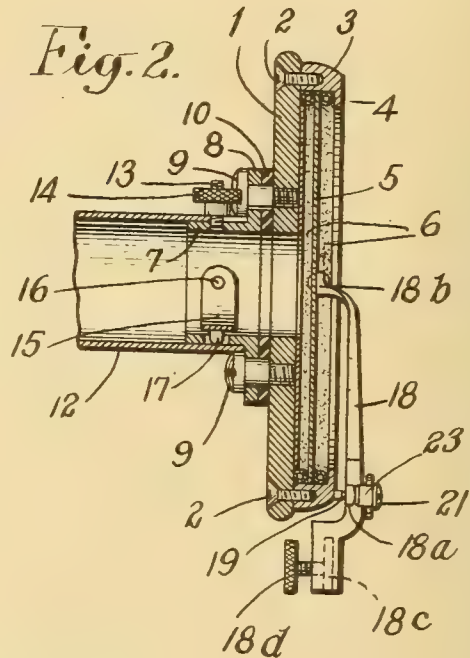


Fig. 3,

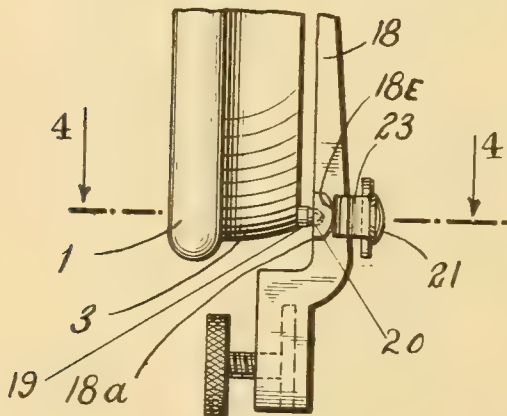


Fig. 4,

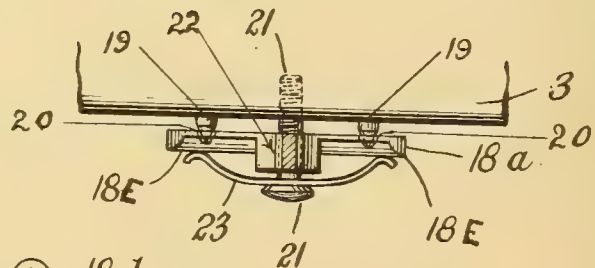
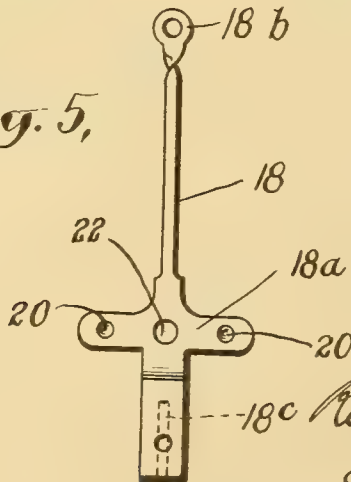


Fig. 5,



WITNESSES
C. W. Brindley
Edward W. Smith

INVENTOR
Richard James Prettie
BY
F. W. Schenck ATTORNEY

UNITED STATES PATENT OFFICE.

RICHARD JAMES PRETTIE, OF JAMAICA, NEW YORK, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

SOUND-BOX.

1,253,527.

Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed January 26, 1915. Serial No. 4,494.

To all whom it may concern:

Be it known that I, RICHARD JAMES PRETTIE, a citizen of the United States, residing at Jamaica, in the county of Queens and State of New York, have invented certain new and useful Improvements in Sound-Boxes, of which the following is a specification.

My invention relates to improvements in sound-boxes, the features and advantages of which will be apparent to those skilled in the art from an understanding of the following description in connection with the drawings.

In the latter, Figure 1 is a face view of the sound-box with a portion broken away; Fig. 2 is a section partly in elevation on the line 2—2 in Fig. 1 looking in the direction of the arrows; Fig. 3 is an enlarged detail of Fig. 2, Fig. 4 is a section partly in plan through the line 4—4 in Fig. 3, and Fig. 5 is an enlarged view of the back of the stylus-arm.

Describing now the devices of the drawings, 1 is the back of the sound-box secured by screws 2 to the ring 3 having an inwardly directed front flange 4. 5 is the diaphragm mounted in the space between the back 1 and flange 4 between the usual rubber gaskets 6.

The neck of the sound-box consists of a sleeve 7 having a flange 8 secured by shoulder-screws 9 to the back 1 with a rubber washer 10 between them. The back-plate has a central opening through it continuous with the sleeve 7.

The sound-box is attachable to the tone-arm as follows, the end of the latter being shown at 12 Fig. 2. The neck 7 of the sound-box has an outwardly projecting threaded-pin 13 bearing a thumb-nut 14. The neck telescopes into the end of the tone-arm which is notched to receive the pin 13 as shown in Fig. 2, whereupon the thumb-nut may be tightened to secure the sound-box rigidly to the tone-arm. The notch or slot is, of course, so located as to give the sound-box the desired operative position for example with the stylus bar inclined as indicated in Fig. 1.

In Fig. 2, I show a further means for detachably connecting the sound-box to the tone-arm without objectionable looseness or rattle which may be used either independently of or in conjunction with the described thumb-nut 14. This consists of a circumferentially-disposed leaf-spring 15 bent to

conform closely to the internal circular cross-section of the neck 7. A rivet 16 through one end of the spring and the wall of the neck secures the spring in its described position within the neck. The other end of the spring is free and has a stud 17 projecting through a hole in the neck 7 to bear against the interior of the tone-arm 12. In this way the outside surface of the neck is brought into firm, holding, non-rattling contact with the interior of the tone-arm.

18 is the stylus-bar pivoted intermediate its length on the pointed pins 19 projecting from the ring 3. At this place, the stylus bar has a cross piece 18^a formed with sockets 20 against the bottoms of which the pivot-pins bear as indicated in Figs. 3 and 4. The upper arm of the stylus bar has a foot 18^b by which it is secured to the center of the diaphragm and its lower arm has the usual stylus or needle receiving socket 18^c with co-operating set-screw 18^d.

The stylus-bar is operatively held on the points of the pivot pins 19 by means as follows: 21 is a screw tapped into the ring 3 of the sound-box and intermediately extending without contact (see Fig. 4) through a considerably larger hole 22, (compare Fig. 5) in the cross-piece 18^a of the stylus-bar on a line with the sockets 20. 23 is a flat or leaf-spring bent in the form of a bow having a central hole through which the shank of the screw 21 passes. The bent-back ends of this spring bear on the cross-piece 18^a and force its sockets 20 into contact with the points of the pivot-pins 19 with a spring pressure depending on the adjustment of the screw 21, whose head, it will be noted, bears against the middle portion of the spring. Finally it will be noted that the top portions 18^e of the cross-piece 18^a over the pivot-pins are transversely rounded. (See Fig. 3 and compare Fig. 4.) The spring 23 bears on these transversely round top portions, their curvature having a greater radius than the shortest distance between said top-portions and their respective pivot points.

What I claim is:—

1. In combination, a tone-arm, a sound-box, and connecting means between them comprising a tubular neck on the sound-box telescoping with the tone-arm, and a leaf spring attached to the interior of the inner telescoping part, the free portion of said

spring having a lateral projection which extends outwardly through an opening provided for it in said inner telescoping part into contact with the inner surface of the
5 outer telescoping part.

2. In combination, a tone arm; a sound box; and connections between them comprising a tubular neck on the sound box telescoping with the tone arm, and a leaf
10 spring disposed circumferentially within the inner telescoping part and bent to conform to the curvature thereof, so as to fit closely against the inner surface of said part, the free portion of said spring having a lateral
15 projection which extends outwardly through an opening provided for it in said inner part into direct contact with the inner surface of the outer telescoping part.

3. In combination, a tone arm; a sound box;
20 and connections between them comprising a tubular neck on the sound box telescoping with the tone arm, a pin-and-slot connection

between said neck and said tone arm for accurately locating the sound box with relation to the tone arm and to hold it against
25 rotation, and spring means within the interior of the inner telescoping part located opposite said locating means and extending through an opening provided for it in the
30 said inner telescoping part into direct contact with the inner surface of the outer telescoping part, thereby to positively secure said neck and tone arm together in such telescoped and located relation, so as to prevent
35 rattling of the sound box.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 25th day of January, 1915.

RICHARD JAMES PRETTIE.

Witnesses:

E. W. SCHERR, Jr.,
J. F. MEADE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND TRANSMITTING APPARATUS.

1,253,533 ----- H. W. Rogers,
Patented Jan. 15, 1918,
Filed Apr. 19, 1916.

1,253,533.

2 SHEETS—SHEET 1.



J. P. Tomlin
R. L. Parker

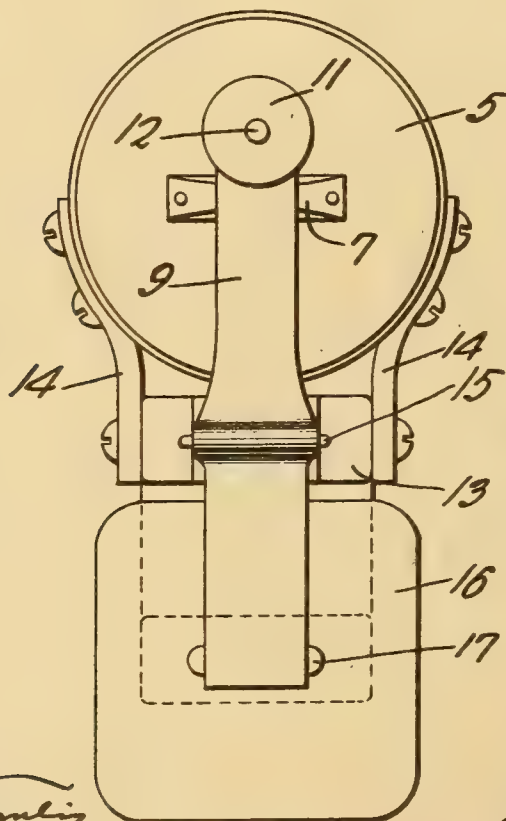
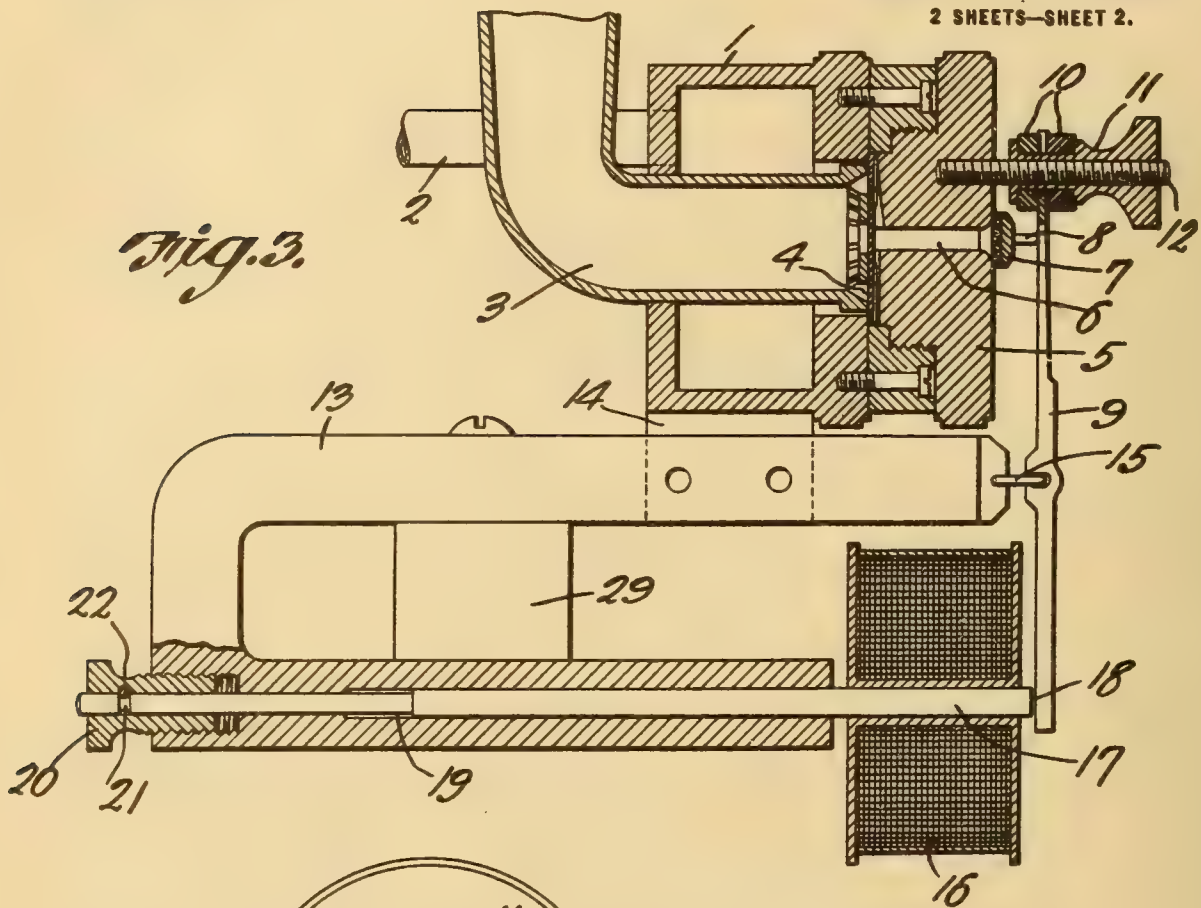
Chas Knowlton.

Attorneys

H. W. ROGERS.
SOUND TRANSMITTING APPARATUS.
APPLICATION FILED APR. 19, 1916.

1,253,533.

Patented Jan. 15, 1918.
2 SHEETS—SHEET 2.



Witnesses

J. R. Tomlin
R. L. Parker

by

H. W. Rogers Inventor

C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

HARRISON W. ROGERS, OF NEW YORK, N. Y.

SOUND-TRANSMITTING APPARATUS.

1,253,533.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed April 19, 1916. Serial No. 92,200.

To all whom it may concern:

Be it known that I, HARRISON W. ROGERS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Sound-Transmitting Apparatus, of which the following is a specification.

The present invention relates to sound transmitting and producing apparatus, and aims to provide novel and improved means for controlling a pneumatic sound box, such as is disclosed in the Letters Patent granted to E. H. Kaufman on August 24, 1915, No. 1,151,472.

In said patented structure, the controlling valve is operated by a needle bar, carrying a needle for engaging the record of a phonographic machine, whereby the sound box is assembled with and constitutes a part of said machine. It is the object of this invention to provide novel and improved, yet simple and inexpensive means for operating the controlling valve with the sound box located at a distance from the record and its operating mechanism. This is of advantage when it is desired to produce the sound at a point remote from the record, and is especially advantageous in connection with a phonographic mechanism used with motion picture machines, whereby the record can be operatively connected directly with the motion picture machine, while the sound producing apparatus is located at a distant point or at such a position as to be most effectively heard by the audience. The present invention also enables a number of the sound boxes to be used and operated from a single record.

It is also the object of the invention to provide simple yet efficacious means for electrically operating the controlling valve of the sound box, for the purposes above indicated, and through the medium of a microphone or equivalent device, which can be operated by a needle engaging a sound producing record, or operated by sound waves direct, so that the present apparatus serves to amplify the sound produced without sacrificing the distinctness of articulation, purity of tone, and the like.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the com-

bination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the sound box and the magnetic device for controlling the valve thereof.

Fig. 2 is a diagrammatical view of the apparatus.

Fig. 3 is a view showing the sound box and part of the magnetic device in section.

Fig. 4 is an end view of the parts illustrated in Fig. 1.

The present improvements are used with the pneumatic sound box disclosed in the above mentioned patent, and since the details and operation of the sound box are fully described in said patent, they need not be considered fully in the present case, since the sound box *per se* merely coöperates in a general sense with the present improvements, the present improvements residing in a device for controlling the valve of the pneumatic sound box. Reference can be had to said patent for a full disclosure of the sound box, but generally considered, it embodies an air drum or chamber 1 supplied with air under pressure through an inlet 2, and having an outlet tube or horn 3, adjacent the end of which is a diaphragm 4 mounted for producing amplified tones. A plug 5 is assembled with the drum 1 and has a bore 6 leading from the diaphragm providing a column of air which is controlled by a valve 8 at the end of the bore, whereby the valve in being vibrated, results in impulses being transmitted to the diaphragm. The valve 7 has a stem 8 bearing against a bar 9, which in the present case is an armature of a magnet. The upper bifurcated terminal of the bar 9 is disposed between a pair of rubber or equivalent washers 10 mounted upon an adjusting nut 11 threaded upon a stud 12 carried by the plug 5. The foregoing parts, with the exception of the use of the bar 9 as an armature, are the same as the corresponding parts disclosed in said patent, the movement of the bar 9 controlling the position of the valve

7, whereby sounds are produced corresponding to the vibrations of the bar 9. Instead of the bar 9 being a needle bar, and having a needle attached thereto to work within the
5 phonic groove of a record, as disclosed in said patent, the bar 9 is controlled electromagnetically, so as to control it from a point remote from a transmitting device, such as a microphone.

10 In carrying out the present invention, there is employed a U-shaped permanent magnet 13 whose limbs are preferably arranged parallel with the axis of the air drum 1, and one of the limbs of the magnet
15 and sound box can be rigidly attached, for assembling them in a convenient manner, by means of straps 14, or in any other convenient manner. This will rigidly connect the permanent magnet and sound box to hold
20 them in proper relative position. The bar 9, which provides an armature lever, is pivotally connected between its ends to one terminal of the magnet 13 preferably to that limb of the magnet to which the sound box
25 is attached. The armature lever 9 can be readily fulcrumed to the terminal of the electromagnet by means of a link 15 or in any other suitable manner.

The other limb of the magnet 13 is shorter
30 than the first mentioned limb which is attached to the sound box, to accommodate an electromagnet 16 adjacent the terminal thereof, and which has its core 17 elongated and in fact constituting one pole of the per-
35 manent magnet. One arm of the armature lever 9 projects close adjacent the end of the core 17, to provide an air gap 18 between said core and armature lever which can be adjusted, as will presently appear.

40 The core 17 of the electromagnet extends rearwardly therefrom and is slidable within a bore 19 extending longitudinally through the respective limb of the magnet 13, whereby said core can be slid to carry
45 the electromagnet longitudinally therewith, whereby to adjust the air gap 18. As a convenient means for adjusting the core 17, the rear terminal thereof has rotatably mounted thereon a tubular adjusting screw
50 20 threaded into the basal portion of the respective limb of the magnet 13. The core 17 is made to move longitudinally with the screw 20, this being readily accomplished by providing the core 17 with an annular
55 groove 21 receiving a pin 22 engaged within the screw 20. Any other suitable means, however, can be provided for adjusting the core. With the present device, when the screw 20 is rotated, the core is adjusted lon-
60 gitudinally to move it either toward or away from the armature lever, whereby an accurate adjustment of the air gap is possible. The permanent magnet 13, together with the core 17 and respective arm of the arma-
65 ture lever 9 provide a magnetic circuit, and

the armature lever being attracted toward the permanent magnet, will be held at a pre-determined position when the electromagnet is in passive condition, it being prefer-
70 able to so adjust the core 17 that there is a proper air gap 18 between it and the armature lever 9, to prevent the armature lever from sticking to the core, whereby to en-
75 hance the responsiveness of the armature lever to slight variations in the current traversing the electromagnet.

The electromagnet 16 is interposed in an electrical circuit 23, which includes a bat-
80 tery 24 or any other suitable source of electrical energy, a switch 25, and a microphone or equivalent transmitting device 26. As illustrated in Fig. 2, this microphone 26 is provided with a needle 27 for operating it,
85 and adapted to engage the phonic groove of a sound producing record 28, although it is to be understood that the microphone can be operated by sound waves direct, to control the current flowing through the microphone
90 and electromagnet. The microphone can be disposed at any suitable distance from the sound box, and a number of electromagnets 16 can be connected in the circuit, whereby a plurality of sound producing apparatus
95 can be used with a single microphone or transmitter.

The limbs of the permanent magnet 13
can be held spaced and rigid by means of a spacer 29 therebetween, and said magnet and
100 sound box can be supported in any suitable manner at the desired point where the sounds are to be produced in a theater, hall, or the like.

In operation, with a steady flow of a weak current, or with no flow of current through
105 the electromagnet 16, the armature lever 9 remains stationary, being held in this position by the permanent magnet. Now, when the microphone 26 is operated, either by the needle 27 engaging the sound producing
110 record 28, or by sound waves direct, the current flowing through the electromagnet 16 will receive impulses corresponding to the sound waves, and the electromagnet in being energized will counteract the magnetism
115 of the permanent magnet. In other words, the magnetism created by the electromagnet opposes or counteracts the magnetism of the core 17, thereby resulting in the movement of the armature lever, and as the impulses
120 change in rapid succession, the armature lever will be vibrated, to correspond with the sound waves, thus controlling the valve 7 correspondingly, and resulting in the pro-
125 duction of the sound waves by the diaphragm 4 passing out through the tube or horn 3. The sound box serves to greatly amplify the sound waves, whereby there is a materially increased volume of sound, retaining
the fine qualities thereof.

The advantages and attributes of the pres- 130

ent improvements will be obvious to those skilled in the art, in connection with the foregoing.

Having thus described the invention, what is claimed as new is:

1. The combination with a pneumatic sound box and its controlling valve, of a permanent magnet, an armature controlling said valve, and an electromagnet having a core adjustably carried by the permanent magnet and forming a part of the magnetic circuit, there being an air gap between said core and armature which can be controlled by the adjustment of the core, and the armature being responsive to the electromagnet.

2. The combination with a pneumatic sound box and its controlling valve, of a permanent U-shaped magnet having one limb shorter than the other, an armature lever fulcrumed between its ends to the terminal of the second mentioned limb, one arm of said lever controlling said valve, an electromagnet having an elongated core slidably engaging the first mentioned limb of the magnet and coöperating with the other arm of the armature lever, the first mentioned limb of the magnet accommodating the electromagnet, the permanent magnet together with the core and second mentioned arm of the armature lever providing a magnetic circuit, there being an air gap between the core and armature lever which can be adjusted by adjusting the core.

3. The combination with a pneumatic sound box and its controlling valve, of electro-magnetic means for controlling said valve, including a permanent magnet, an

adjustable core mounted in said magnet, a coil surrounding said core, and an armature lever operably connected to the valve at one end and disposed in attractive relation to the core, said core being adjustable to regulate the air gap between it and the armature.

4. The combination with a pneumatic sound box and its controlling valve, of electro-magnetic means for controlling said valve, including an electro-magnet having a hollow core, said electro-magnet being double poled, one of said poles being provided with a longitudinal bore therethrough, a coil surrounding said core, and an armature fulcrumed intermediate of its ends, one of said ends being operably connected to the valve and the other being disposed in attractive relation to the pole.

5. The combination with a pneumatic sound box and its controlling valve, of electro-magnetic means for controlling said valve, including a double poled electro-magnet, one of said poles being provided with a longitudinal bore therethrough, a core mounted in said bore for longitudinal movement, adjusting means connected to the core and to the magnet for imparting longitudinal movement to the core, a coil surrounding one end of the core, and an armature fulcrumed intermediate of its ends and having one end operably connected to the valve and the other disposed in attractive relation to the core.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

HARRISON W. ROGERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

ACOUSTICAL INSTRUMENT.

1,253,613 ----- L. Lumiere,
Patented Jan. 15, 1918.
Filed July 5, 1912.

L. LUMIERE.
ACOUSTICAL INSTRUMENT.
APPLICATION FILED JULY 5, 1912.

1,253,613.

Patented Jan. 15, 1918.

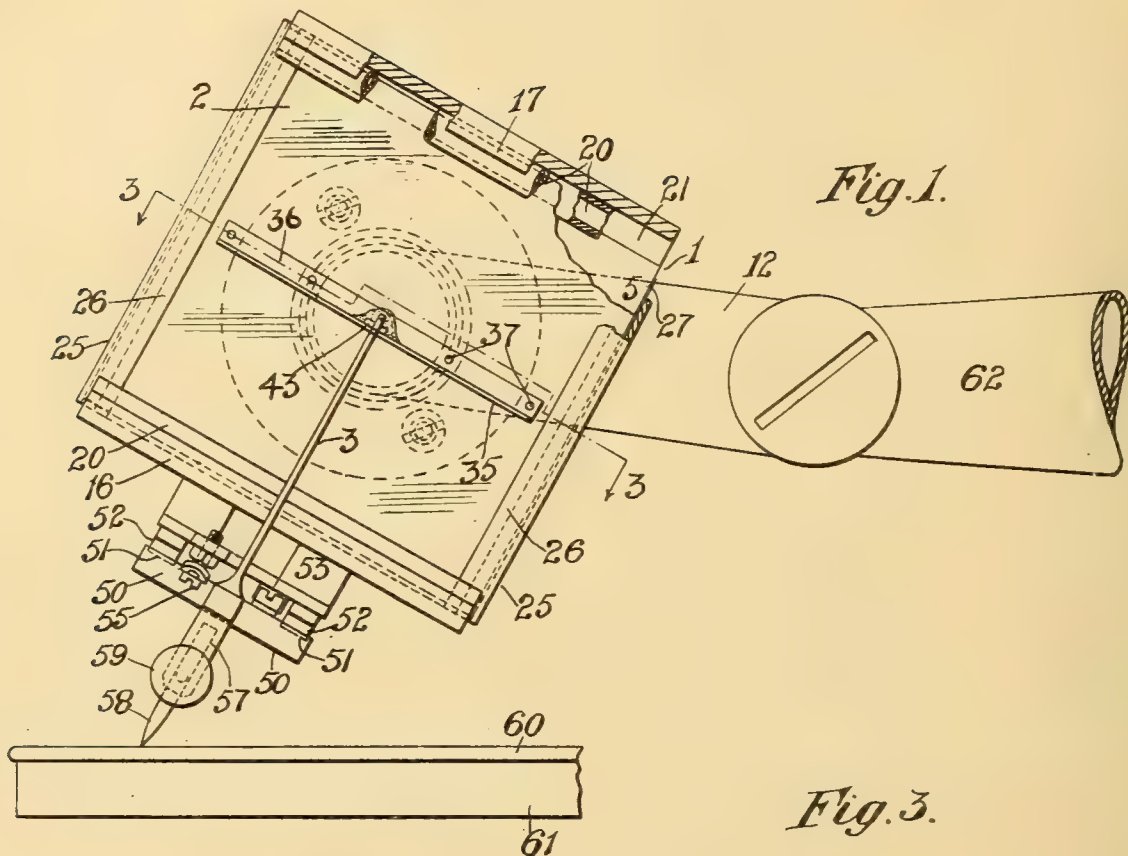


Fig. 3.

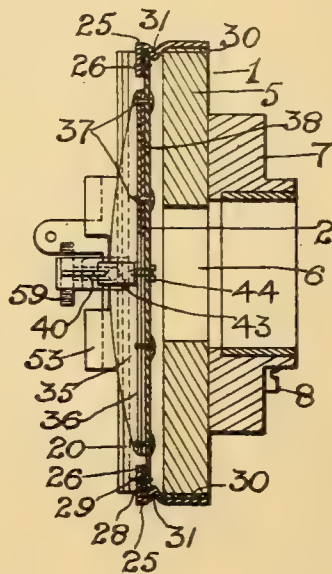
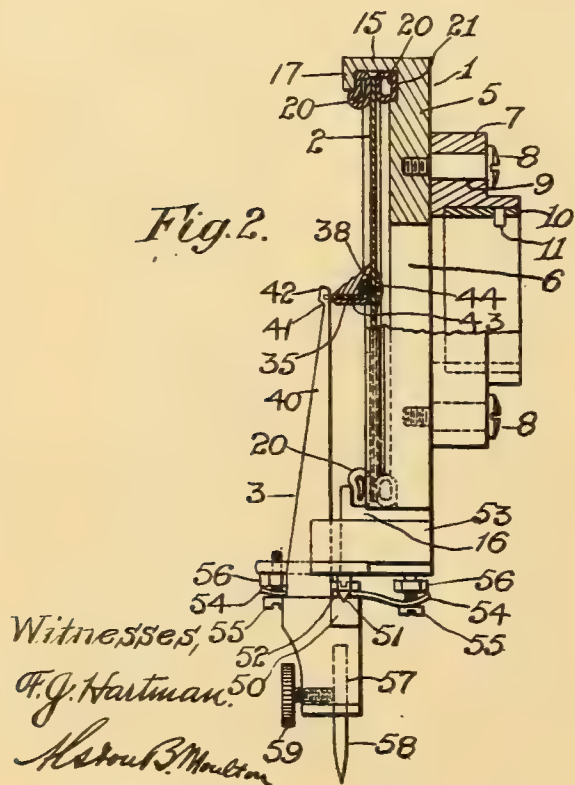


Fig. 2.



Witnesses,

F. G. Hartman.

Robert B. Moulton

Inventor.

Louis Lumiere.

By H. W. Pettit,
Attorney.

UNITED STATES PATENT OFFICE.

LOUIS LUMIERE, OF LYON, FRANCE, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

ACOUSTICAL INSTRUMENT.

1,253,613.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed July 5, 1912. Serial No. 707,769.

To all whom it may concern:

Be it known that I, LOUIS LUMIERE, a citizen of the Republic of France, residing at Lyon, in the Republic of France, have invented certain new and useful Improvements in Acoustical Instruments, of which the following is a specification.

The main objects of this invention are, to provide an improved sound box for talking machines; to provide in a sound box for talking machines an improved diaphragm and mounting therefor; and to provide other improvements as will appear hereinafter.

In the accompanying drawings, Figure 1 is a fragmentary front elevation of a sound box constructed in accordance with this invention and applied in a talking machine; Fig. 2 a side elevation of the same partly in longitudinal central section; and Fig. 3 a transverse section of the same on line 3—3 of Fig. 1, looking in the direction of the arrows.

Referring to the drawings, one embodiment of this invention comprises a sound box including a casing 1, a substantially rectangular and preferably substantially square flexible diaphragm 2, and a stylus bar 3 mounted to oscillate upon the casing and connected to the diaphragm 2.

The casing 1 includes a substantially flat rigid back plate 5, preferably made of brass or other similar material, and preferably rectangular and substantially square in front elevation. This back plate is provided centrally with a cylindrical aperture 6, which is surrounded upon the rear side of the back plate by a yielding tubular extension 7 which is clamped to the back plate by means of headed screws 8 which are threaded into the back plate through apertures 9 provided therefor in the yielding extension. The yielding tubular extension 7 is provided with an internal rigid tubular bushing or lining 10 having a pin 11 projecting inwardly therefrom and rigidly connected therewith for holding the sound box in place upon a tubular support 12.

For holding the diaphragm 2 in position, the back plate 5 is provided with forwardly projecting oppositely disposed substantially flat and parallel marginal retaining walls 15 and 16 integral with or rigidly secured to the back plate 5. The front edge of each

of these retaining walls 15 and 16 is provided with an inwardly extending flat flange 17 integral therewith or rigidly secured thereto, and arranged in a plane parallel to the back plate 5. In the recess formed by the back plate and each retaining wall 15 and 16 and its flange 17 are two spaced yielding supports 20, one of these supports being outside of and spaced from the other support, the outer support being in contact with and normally compressed by the corresponding flange 17, and the inner support fitting snugly and being slightly compressed in an internal recess 21 provided therefor in the front face of the back plate 5.

The diaphragm 2 is spaced slightly in front of the back plate 5 and is arranged to be normally parallel thereto, two opposite edges or marginal portions of the diaphragm projecting between the corresponding tubular supports 20 respectively and being yieldingly clamped in position thereby, these edges of the diaphragm being spaced from the retaining walls 15 and 16 to permit of the movement of the diaphragm in its own plane. The other two parallel edges or marginal portions 25 of the diaphragm are substantially flush with the corresponding edges of the back plate 5 and are free to flex throughout their full lengths with respect to the back plate.

To prevent the escape of sound waves between the free edges of the diaphragm and the back plate 5, a strip 26 of very thin and flexible material, such as cloth or woven fabric, or any other suitable yielding material, is secured to each free marginal portion or edge 25 of the diaphragm and to the adjacent end wall 27 of the back plate 5 so as to form a yielding closure for the space between the edge 25 of the diaphragm and the opposite edge of the back plate 5. Each strip 26 is preferably arranged to project over the front face of the diaphragm 2 and may be secured in position against the front face of the diaphragm by means of a coating 28 of glue or cement or other similar material, applied between the diaphragm and the strip, and the strip may be also secured to the diaphragm by means of stitching 29. A coating 30 of cement or glue may also be applied between each strip and the adjacent end wall 27 of the back plate 5 to secure the strip to the back plate.

Between the diaphragm and the back plate, each strip 26 is normally folded inwardly, as at 31, to permit of the free movement of the corresponding edge of the diaphragm.

5 For flexing the diaphragm 2 substantially uniformly throughout its full width, the diaphragm is provided with a substantially rigid flat bridge or rib 35 projecting upwardly therefrom in a plane perpendicular
10 thereto, and arranged substantially midway between and parallel to the edges of the diaphragm yieldingly restrained by the yielding supports 20. This bridge is preferably made of very thin steel and is pro-
15 vided on its inner edge with a flat, narrow flange 36 which is secured to the diaphragm by means of rivets 37 extending through the flange and the diaphragm. A coating 38 of cement may be applied between the
20 flange and the diaphragm. The bridge preferably tapers in width from its central portion outwardly in opposite directions, and the outer edge of the bridge is preferably curved from end to end, the bridge prefer-
25 ably extending the greater part of the full width of the diaphragm.

The stylus bar 3 preferably comprises a very thin flat portion 40 made preferably of steel and arranged in a plane perpendicular
30 to the diaphragm 2 and substantially perpendicular to the bridge 35. This portion of the stylus bar tapers in width inwardly toward the bridge 35 and is reduced in width adjacent to its inner end to a very small di-
35 mension, as at 41, opposite the bridge, to permit the bar to flex readily at this point. Just inside of this reduced portion, the stylus bar is slightly enlarged, as at 42, and this enlarged portion is connected to the
40 bridge 35 and to the diaphragm 2 by means of a metallic strip 43. The outer end of this strip 43 is bifurcated, embraces and is secured to the enlarged end 42 of the stylus bar by means of solder, or in any other suit-
45 able manner, and the strip bears against the upper side of the bridge 35 and is secured thereto by solder or otherwise. The inner end of the strip is preferably flanged and is secured to the flanged portion of the bridge
50 by means of a headed screw 44 extending through the diaphragm and the flanged portion of the bridge and threaded in the flanged portion of the strip.

For mounting the stylus bar 3 to oscillate
55 with respect to the casing 1 upon a fixed axis parallel to the plane of the diaphragm, and parallel to the retaining walls 15, the outer portion of the stylus bar is enlarged to form oppositely disposed and comparatively thick
60 and rigid extensions 50 provided on their inner surfaces with spaced V-shaped grooves 51 in which engage knife edges 52 project-
65 ing rigidly outwardly from a rigid base plate 53 rigidly secured to the correspond-
ing retaining wall 15 of the sound box cas-

ing. The extensions 50 are held in engage-
ment with the knife edges 52 by means of a pair of oppositely disposed springs 54, one
end of each spring being connected to one
of the extensions, and the other end of each
70 spring being adjustably connected to the base plate 53 by means of a headed screw 55
extending through the spring and threaded into the base plate 53 and carrying a lock
75 nut 56 threaded thereon between the spring and the base plate. The outer end of the
stylus bar 3 is provided with the usual
socket 57 adapted to receive a stylus 58, and
with a set screw 59 arranged to hold the
stylus in a plane. 80

This improved sound box is adapted to
coöperate with the usual sound record 60,
having lateral undulations corresponding
to sound waves or any other suitable record,
mounted upon a rotary record support 61. 85
When the sound box is used in connection
with a disk-record, as shown, the sound box
is preferably arranged so that its diaphragm
2 will be in a plane perpendicular to the
plane of the record, and so that the stylus
90 and stylus bar will incline, as usual, with respect to the record.

In this instance, the tubular support 12,
which carries the sound box, is pivotally
connected to the free end of a hollow tone
95 arm 62 with which it communicates, and which is mounted to swing in a plane parallel to the record. It is to be understood, of course, that the sound box may also be
used with cylindrical records, or with rec-
100 ords of any suitable shape, also that the stylus bar and its mounting may be modified, if necessary, to adapt the sound box for use with any particular record.

In the operation of this improved sound
105 box, it is evident that the diaphragm flexes freely between the two pairs of spaced tubular supports in response to the oscillation of the stylus bar, the restrained edges of the diaphragm consequently alternately ap-
110 proaching and receding from each other.

Although only a single form has been
illustrated in which this invention may be
embodied, the invention is not limited to the
specific construction shown, but may be em-
115 bodied in various other forms to meet various requirements, without departing from the spirit of this invention or the scope of the appended claims.

Having thus fully described this inven-
120 tion, I claim and desire to protect by Letters Patent of the United States:

1. In a sound box, the combination with a flexible substantially rectangular dia-
125 phragm, provided with means substantially midway between two of the opposite sides of said diaphragm and extending trans-
versely thereof and secured thereto for hold-
ing the longitudinally central portion of
said diaphragm against flexing transversely, 130

and means connected to said first mentioned means for flexing said diaphragm longitudinally.

2. In a sound box, the combination with
5 a flexible substantially rectangular diaphragm, of means engaging opposite marginal portions of said diaphragm for holding said diaphragm in position, and elongated means uniformly secured to said diaphragm intermediate of said portions and parallel thereto for flexing said diaphragm.

3. In a sound box, the combination with a polygonal diaphragm, of a pair of substantially straight yielding supports parallel with and adjacent to each of a pair of opposite sides, and engaging respectively the opposite sides of said diaphragm, said edges being yieldingly restrained by said supports, freely movable closures connecting the intermediate edges of said diaphragm to the
20 sound box casing, and means connected to said diaphragm parallel to said restrained edges and intermediate of said supports for flexing said diaphragm on lines at right angles to said restrained edges, said means comprising an elongated reinforced member and being operative to restrain said diaphragm from being flexed on lines parallel to said restrained edges.

4. In a sound box, the combination with a polygonal diaphragm, of a pair of substantially straight yielding supports parallel with and adjacent to each of a pair of opposite edges and engaging the respective opposite sides of said diaphragm, said edges being yieldingly restrained by said supports, freely movable closures connecting the intermediate edges of said diaphragm to the
40 sound box casing, and means connected to said diaphragm intermediate of said supports for flexing the same at right angles to said supports and for preventing the flexure of said diaphragm on lines parallel to said supports, said means comprising an elongated reinforced member extending transversely of said diaphragm and uniformly engaging therewith.

5. In an acoustical instrument, a polygonal diaphragm having opposite yieldingly restrained edges and opposite free edges, and a folded yielding member secured to each of said last-named edges.

6. In an acoustical instrument, a flexible polygonal diaphragm having opposite yieldingly restrained edges and opposite free edges, and a plaited yielding member secured to each of said last-named edges.

7. In a sound box, the combination of a casing with a diaphragm, means restraining opposite edges of said diaphragm, and freely movable closures comprising a fold connecting said diaphragm to said casing intermediate of said edges.

8. In a sound box, the combination with
65 a flexible diaphragm, of means restraining

said diaphragm at spaced points and means engaging said diaphragm between said points and arranged to flex said diaphragm on a line connecting said points and to hold said diaphragm against flexing on a line
70 perpendicular to said first mentioned line.

9. In a sound box, the combination with a flexible diaphragm, of means restraining spaced portions of said diaphragm, an elongated substantially rigid rib secured to said
75 diaphragm and spaced between said portions and extending transversely with respect to a line connecting said portions, and means cooperating with said rib to flex said diaphragm in accordance with sound waves, said rib being maintained at all times in parallelism with a given straight line and said diaphragm being free to flex at all points between said rib and each of said portions, said rib being operative to prevent
85 the flexure of said diaphragm on lines perpendicular to said first mentioned line.

10. In a sound box, the combination with a substantially rectangular flexible diaphragm, of spaced substantially parallel
90 means restraining opposite marginal portions of said diaphragm, a comparatively rigid rib spaced between and parallel to said marginal portions and secured to said diaphragm, and a stylus bar connected to said rib and mounted to oscillate about an axis parallel thereto for flexing said diaphragm, said diaphragm being free to flex at all points between said rib and each of said marginal portions and restrained from flexure on lines parallel to said parallel means.

11. In a sound box the combination with a flexible diaphragm, of substantially parallel means restraining oppositely disposed marginal portions of said diaphragm, an
105 elongated substantially rigid rib engaging said diaphragm between said portions and parallel to said means, and a stylus bar mounted to oscillate about an axis substantially parallel to said rib and arranged to vibrate said rib, said diaphragm being free to flex at all points between said rib and each of said marginal portions.

12. A sound box comprising a casing, a flexible diaphragm having two substantially
115 parallel diametrically opposite marginal edges, yielding means carried by said casing and restraining said edges, an elongated rib substantially parallel to said edges and to said yielding means, and engaging said diaphragm, and a stylus bar connected to said rib and arranged to oscillate about an axis substantially parallel thereto, said diaphragm being free to flex at every point between said rib and said yielding means perpendicular to said restrained edges.

13. A sound box comprising a casing, a flexible diaphragm having two substantially parallel diametrically opposite marginal edges, yielding means carried by said casing
130

and restraining said edges, an elongated rib substantially parallel to said edges and engaging said diaphragm, and extending the greater part of the distance between opposite edges of said diaphragm, and a stylus bar connected to said rib and arranged to oscillate about an axis substantially parallel thereto, said diaphragm being free to flex at every point between said rib and said yielding means.

14. A sound box comprising a flexible diaphragm, of substantially uniform thickness, means comprising a plurality of straight tubular gaskets restraining opposite marginal portions of said diaphragm, an elongated comparatively rigid element secured to said diaphragm between said portions and extending the greater portion of the distance between opposite marginal edges of said diaphragm and substantially parallel to said restrained edges, and means arranged to vibrate said element in accordance with sound waves, said diaphragm being free to flex at every point between said element and said restraining means along lines at right angles to said restrained marginal portions, said rib serving to restrain said diaphragm from flexure along lines at right angles to the free marginal portions thereof.

15. In a sound box, the combination of a

diaphragm free at opposite edges and restrained adjacent opposite edges perpendicular to said first mentioned edges, and means for preventing flexure of said diaphragm except on lines substantially at right angles to said restrained edges.

16. In a sound box, the combination of a rectangular diaphragm restrained adjacent one pair of oppositely disposed edges only, and means extending substantially across the face of said diaphragm operative to prevent the flexure of said diaphragm on lines parallel to said restrained edges.

17. In a sound box, the combination of a square diaphragm, means for restraining said diaphragm along lines parallel to and adjacent one pair of its oppositely disposed edges, and means secured to and extending substantially across the face of the diaphragm operative to flex said diaphragm along lines at right angles to said first mentioned means and to prevent flexure thereof along lines perpendicular thereto.

In witness whereof, I have hereunto set my hand this 14th day of June, A. D., 1912.

LOUIS LUMIERE.

Witnesses:

CLARENCE CARRIGAN,
GASTON YEAUNIAUX.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND RECORDING AND REPRODUCING MACHINE.

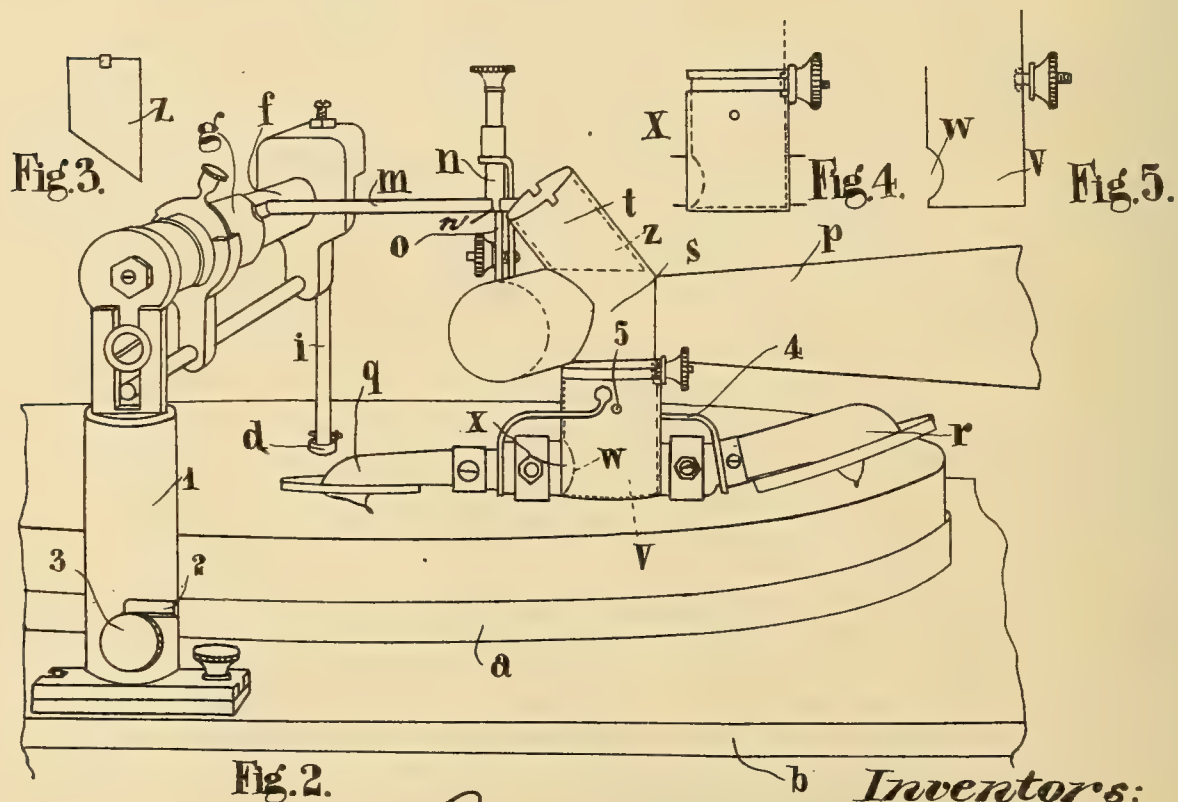
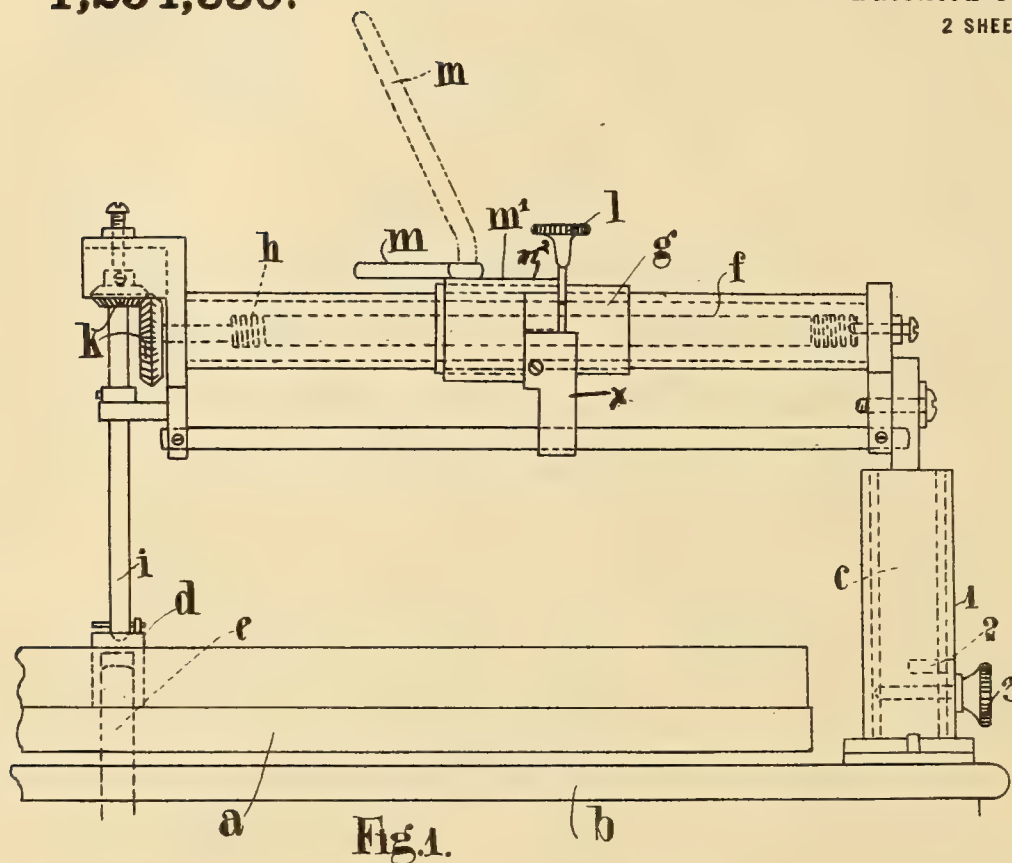
1.254.330 ----- D. F. & K. D. McQuire,
Patented Jan. 22, 1918,
Filed June 1, 1917.

D. F. & K. D. McQUIRE.
SOUND RECORDING AND REPRODUCING MACHINE.
APPLICATION FILED JUNE 1, 1917.

1,254,330.

Patented Jan. 22, 1918.

2 SHEETS—SHEET 1.



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D. F. & K. D. McQUIRE.
SOUND RECORDING AND REPRODUCING MACHINE.
APPLICATION FILED JUNE 1, 1917.

1,254,330.

Patented Jan. 22, 1918.
2 SHEETS—SHEET 2.

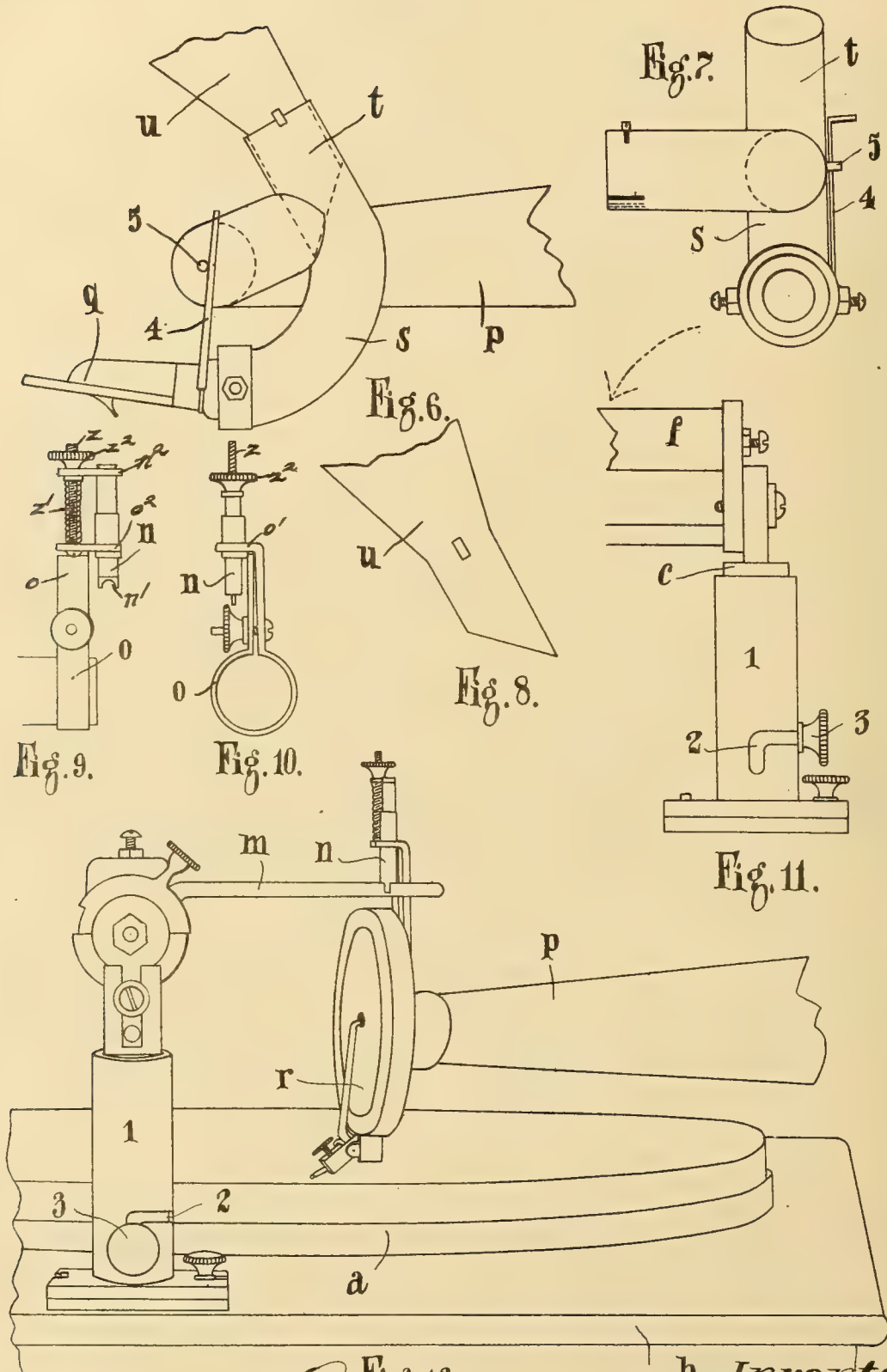


Fig. 12.
b Inventors:
David F. McQuire,
Kenneth G. McQuire,
By *Spear Middleton*, *Attorneys*.

UNITED STATES PATENT OFFICE.

DAVID FREDERICK McQUIRE AND KENNETH DOUGLAS McQUIRE, OF HORNCHURCH, ENGLAND.

SOUND RECORDING AND REPRODUCING MACHINE.

1,254,330.

Specification of Letters Patent.

Patented Jan. 22, 1918.

Application filed June 1, 1917. Serial No. 172,304.

To all whom it may concern:

Be it known that we, DAVID FREDERICK McQUIRE and KENNETH DOUGLAS McQUIRE, both subjects of the King of Great Britain and Ireland, and both residing at Braemore, Herbert Road, Hornchurch, in the county of Essex, England, have invented certain new and useful Improvements in Sound Recording and Reproducing Machines, of which the following is a specification.

This invention relates to sound recording and sound reproducing machines employing disk records and of the type adapted both for the recording of sounds and for the reproduction of sounds thus recorded, the invention being principally adapted for domestic and office use.

The object of the present invention is to provide an improved form of machine of the above character in which the reproduction of the recorded sounds may be effected through the usual tone arm, sound chamber or amplifying horn without damage to the record, due to the fact that by reason of our construction the recording stylus or like member and the reproducing member both move across the face of the record in the same path instead of as is usual the one member moving in a rectilinear path and the other in a curved path.

The invention consists in a sound recording and sound reproducing machine comprising in combination a record supporting member, a tone arm, a member movable rectilinearly across the face of the record and means connecting the tone arm with this latter member but slidable upon said member.

The invention also comprises a sound recording and sound reproducing machine of the above character having a carrier for the recorder and reproducer, rotatable about a vertical axis, so that either the recorder or reproducer may be moved into its operative position.

The invention further comprises other details and arrangements hereinafter more particularly described.

The accompanying drawings illustrate two modes of carrying out the invention:

Figure 1 is a front elevation of one form of device in accordance with the invention

when applying it to an ordinary gramophone;

Fig. 2 is a perspective view of the arrangement shown in Fig. 1;

Figs. 3, 4 and 5 are views illustrating details;

Fig. 6 is a view showing a modification in accordance with the invention;

Fig. 7 is a side view of the arrangement shown in Fig. 6; and

Fig. 8 is a fragmentary view of a portion of the device in Fig. 6;

Figs. 9 and 10 are a side view and front view respectively of a detail shown in Fig. 2;

Fig. 11 is a view showing a detail; while

Fig. 12 is a view illustrating a modified form of reproducer.

In carrying our invention into effect in one convenient manner as, for example, in its application to a machine of the gramophone type, we provide the usual turntable *a* driven by any suitable motor (not shown) and located within a cabinet *b* if desired. Upon the cabinet or framework *b* we mount a pillar *c* (or the same may be independently mounted) and upon this pillar or support *c* and a socket *d* upon the spindle *e* of the turntable we arrange a tubular or other carrier *f* adapted to support a sleeve or like member *g* and provided with suitable means for moving the sleeve or the like longitudinally or axially. For example, the sleeve or the like *g* may be fitted with a half nut (not shown) adapted to engage a longitudinal screw *h* driven from the turntable by shaft *i* and bevel gearing *k* and fitted with any usual form of half nut or other quick release actuated by the milled head or other member *l*, substantially as shown in English patent of Thoshann, 22,268 of 1911, this subject matter forming *per se* no part of the present invention.

The sleeve *g* is encircled by a second and shorter sleeve *m'*, which is rotatably mounted thereon, the amount of rotation of the sleeve being limited by a projection *m²* on the sleeve coöperating with the upper part of the guide bracket *x* and this sleeve *m'* carries a bar *m*. By rotation of the sleeve in the proper direction the bar *m* may be swung vertically from the position shown in full

lines, the bar by means of its sleeve being capable of being rotated into the position shown by the dotted lines in Fig. 1 when it is desired to clear the machine or otherwise disconnect, or vice versa.

A member n has a forked lower end n' which straddles the outer end of the bar m and to the member n is connected a clamp or support o , which encircles the tone arm.

A convenient manner of effecting this adjustable connection is to provide the clamp o with an angularly turned upper end o' to which is connected the lower end of a screw rod z and which has an extension o^2 working in a vertical slot or bifurcation in the member n . A spring z' tends to force the angular bent part o' in a downward direction, while it may be drawn upwardly against the tension of the spring by a milled nut z^2 bearing against the upper face of a bracket member n^2 supported by the member n . The bar m thus supports the weight of the tone arm p or other member carrying the recorder q and reproducer r , and when in operation communicates the necessary traversing movement to the tone arm.

The clamp o being adjustable vertically permits of the use of recording blanks of different thicknesses and also provides for wear of the blank, while at the same time enabling the recorder and reproducer always to be properly positioned to fulfil their respective functions.

It will be understood that the recorder and reproducer may be removable and may be separately carried upon the machine when required respectively for recording and reproducing, but for convenience we prefer to carry both simultaneously upon the machine and provide means for throwing the one not required at the time out of action.

One method of attaining this object is shown in Fig. 2 according to which there is fitted to the socket of the tone arm p a fitting s upon a tubular extension t to which the recording horn u (Fig. 6) is mounted, the fitting having a second tubular extension v provided with an aperture w and mounted within an outer rotatable sleeve x carrying the recorder and reproducer. The arrangement is such that the sleeve x may be rotated about a vertical axis through 180° , and the recorder and reproducer may be raised or lowered slightly by means of the spring arms or levers 4 which are provided each with a recessed end adapted to be engaged with one or the other of a pair of studs 5 in order to hold the recorder or reproducer in its raised position, so that either may be brought into position for operation and in register with the aperture w communicating with the interior of the fitting s in such a manner as to communicate with the recording horn or with the amplifying horn or chamber which is in communication in the

usual way with the tone arm p . When the recorder is thrown out of operation a plug z may be introduced into the tubular extension t to cut out the recording horn.

It will be seen that with such an arrangement as that above described not only will the weight of the device carrying the recorder and reproducer be adequately supported so that the tone arm with its added weight may be employed for reproduction through the amplifying horn or chamber without fear of damage to the record, but also the necessary movement may be permitted to the recorder or reproducer and owing to the combined movement of the device along the bar m and of the bar m along the carrier f , reproduction and recording take place along an arc of the same dimensions in relation to the turntable.

Figs. 6 and 7 illustrate a modified form of arrangement which is suitable for use when the recorder and reproducer are to be carried separately upon the machine and not as above described simultaneously upon the machine and provided with means for rendering either inoperative as desired. In this case the fitting s is of somewhat similar form to that above described with the exception that it has no movable sleeve on the lower extension. The latter is curved or otherwise suitably formed to carry the reproducer r or the recorder q . The recording horn u may be made to be reversible so that it may either occupy the position shown in Fig. 6 or that shown in Fig. 8, reproduction in the latter case taking place partly through the recording horn or medium and partly through the amplifying horn or chamber while, as before, a suitable stop may be inserted in the upper portion t of the fitting s when reproduction is to take place through the amplifying horn or chamber alone.

When clearing the machine or for other reasons it is desirable that the carrier f should be raised so that the shaft i may be disengaged from the socket d and the whole rotated about the axis of the pillar c , and for this purpose a suitable arrangement is shown in Figs. 1 and 11 in which the pillar c is surrounded by a sleeve 1 having a bayonet or angle socket 2 engaging a stop or projection 3 upon the pillar, so that when the device is in the position shown in Fig. 1 the stop will be in the lowest portion of the socket 2 , while when the device is required to be moved out of the way it may be raised so that the stop comes on a level with the horizontal portion of the slot which thus permits of the rotation of the whole device about the axis of the pillar c through an angle of 90° or of any other desired magnitude.

Fig. 12 shows a modification in accordance with the invention having the same gen-

eral features as those above referred to but with a modified form of reproducer.

Having now described our invention what we claim as new and desire to secure by Letters Patent is:—

1. A sound recording and sound reproducing machine, comprising in combination a record supporting member, a member movable rectilinearly across the face of the record, a carrier for the recorder and reproducer, and means transmitting the movement of the movable member to the carrier and with which said carrier slidably engages.

2. A sound recording and sound reproducing machine comprising in combination a record supporting member, a tone arm, a member movable rectilinearly across the face of the record and means connecting the tone arm with the last named member and slidable thereon.

3. A sound recording and sound reproducing machine comprising in combination a record supporting member, a tone arm, a bar movable rectilinearly across the face of the record and means slidable on said bar and supporting said tone arm.

4. A sound recording and sound reproducing machine comprising in combination a record supporting member, a tone arm, a bar movable rectilinearly across the face of the record and a bracket slidable on said bar and supporting said tone arm.

5. A sound recording and sound reproducing machine comprising a record supporting member, a bar movable rectilinearly across the face of the record and means slidable on said bar and supporting the recorder and reproducer.

6. A sound recording and sound reproducing machine comprising in combination a record supporting member, a member movable rectilinearly across the face of the record, a recorder and reproducer and a vertically adjustable bracket supporting the recorder and reproducer and slidable upon said member.

7. A sound recording and sound reproducing machine comprising in combination a

record supporting member, a bar movable rectilinearly across the face of said member, a tone arm, a recorder and reproducer carried by said tone arm and a bracket supporting said tone arm and slidable upon said bar.

8. A sound recording and sound reproducing machine comprising in combination a record supporting member, a pivoted bar movable rectilinearly across the face of said member, a tone arm, a recorder and reproducer carried by said tone arm and a bracket supporting said tone arm and slidable upon said bar.

9. A sound recording and sound reproducing machine comprising in combination a record supporting member, a pivoted bar movable rectilinearly across the face of said member, a tone arm, a recorder and reproducer mounted upon said tone arm and a vertically adjustable bracket supporting said tone arm and slidable upon said pivoted bar.

10. A sound recording and sound reproducing machine comprising in combination a record supporting member, a pivoted bar movable rectilinearly across the face of said member, a tone arm, a recorder and reproducer mounted upon said tone arm, a vertically adjustable bracket supporting said tone arm and slidable upon said pivoted bar, and means for rendering inoperative either the recorder or reproducer.

11. A sound recording and sound reproducing machine comprising a record supporting member, a bar movable rectilinearly across the face of said member, a tone arm, a recorder and reproducer carried by said tone arm, a socket embracing said tone arm and a vertically adjustable and rotatable pin connected with said socket and slidable on said bar.

In testimony whereof, we have affixed our signatures.

DAVID FREDERICK McQUIRE.
KENNETH DOUGLAS McQUIRE.

SOUND BOX.

1,254,425 ----- H. C. Miller,
Patented Jan. 22, 1918,
Filed April 10, 1914.

H. C. MILLER.

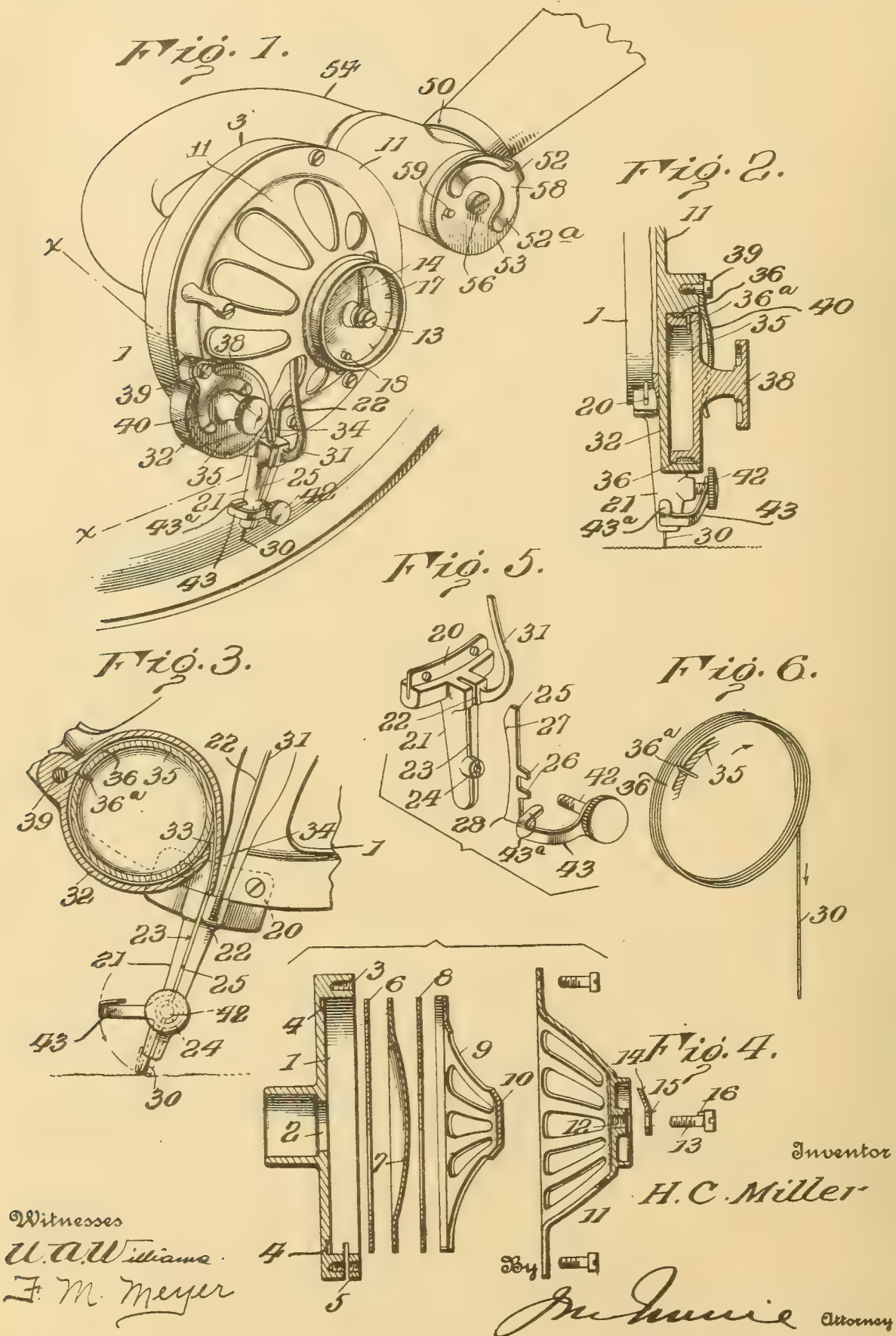
SOUND BOX.

APPLICATION FILED APR. 10, 1914.

Patented Jan. 22, 1918.

2 SHEETS—SHEET 1.

1,254,425.



H. C. MILLER.

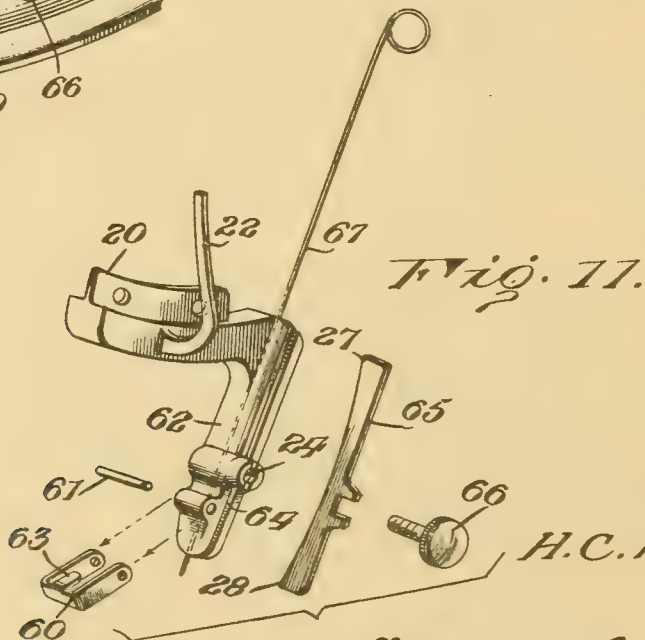
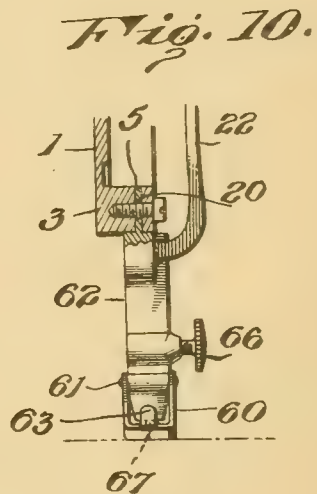
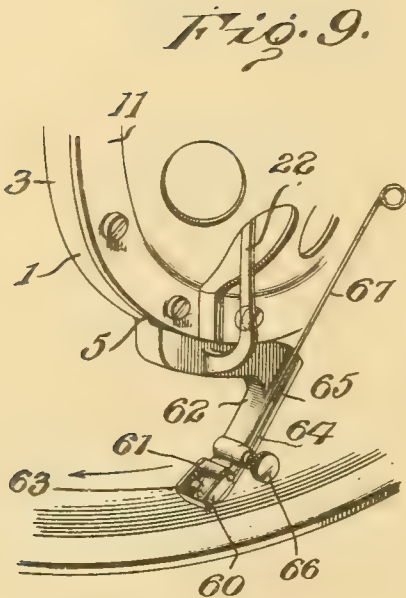
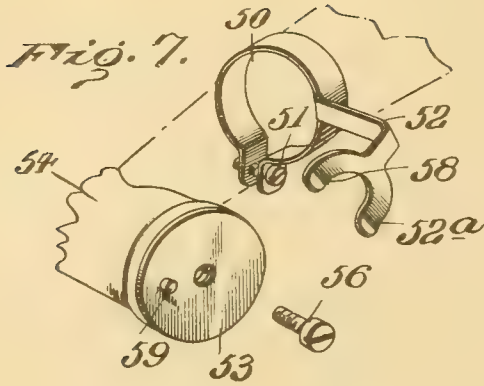
SOUND BOX.

APPLICATION FILED APR. 10, 1914.

Patented Jan. 22, 1918.

2 SHEETS—SHEET 2.

1,254,425.



Witnesses
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By
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UNITED STATES PATENT OFFICE.

HENRY C. MILLER, OF WATERFORD, NEW YORK.

SOUND-BOX.

1,254,425.

Specification of Letters Patent.

Patented Jan. 22, 1918.

Application filed April 10, 1914. Serial No. 831,002.

To all whom it may concern:

Be it known that I, HENRY C. MILLER, a citizen of the United States, residing at Waterford, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in Sound-Boxes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in means for dispensing with individual needles in connection with sound reproducing machines, particularly where records having grooves provided with lateral undulations are employed.

The principal objects of my invention are to provide means for employing a continuous piece of thin wire to be used as a stylus, and gage the feeding of the latter to insure of the correct projection of the wire; to provide improved means for feeding the wire; and to provide safety means to prevent the sound box falling and destroying a record.

I am aware the use of a continuous wire for a stylus for sound reproducing machines is old in the art, numerous attempts having been made to operate the wire automatically, others semi-automatically, and still others being operated purely by guess. However, in all such structures known to me the details are so arranged that foreign sounds are produced, the same being necessarily conveyed to the amplifier and mingling with the reproduction. Furthermore, I find that these foreign sounds cause a material loss of a number of the finer tones, and according to this invention I aim to materially cure and overcome these defects by improving the construction.

In the use of a continuous wire employed as a stylus, it is of the utmost importance when feeding the wire that the latter be fed a predetermined distance, and to this end it is my purpose to provide a gage so arranged that when positioned in the path of the end of the wire, the latter will be limited, which always insures of a uniform stylus. Then again when the wire is to be fed the gage is so constructed that when it

is in operative position the wire clamp will be simultaneously released to permit the feeding of the wire.

My invention also aims to provide simple and effective means for storing the wire, the same consisting of a magazine having frictional means for holding it in any position when manually set.

A number of records are destroyed by the sound box dropping, and to overcome this difficulty I provide special means for holding the sound box in any position within a given range. This feature of my invention is so constructed as not to interfere with the free movement of the needle in the record grooves, the binding action between the parts taking place only after the sound box is slightly elevated from the record.

In addition to the foregoing, my invention comprehends improvements in the details of construction and arrangement of parts which will be hereinafter described, and particularly pointed out in the claims.

In the drawings:—

Figure 1 is a perspective view of my improvement.

Fig. 2 is an enlarged detail view on the line $x-x$ of Fig. 1.

Fig. 3 is an enlarged view of a portion of the sound box and the magazine, the latter being in section.

Fig. 4 is a central section taken through the sound box, the parts being separated.

Fig. 5 is a perspective view of a part of the stylus lever, and the wire clamp, the parts being separated.

Fig. 6 is a detail perspective view of the wire and the manner in which its end is held in the magazine.

Fig. 7 is a detail perspective view of the means for preventing the sound box falling on the record.

Fig. 8 is a detail view of the magazine friction clamp.

Fig. 9 is a detail perspective view of a different form of my invention.

Fig. 10 is a detail end view of the same.

Fig. 11 is a detail perspective view of the parts shown in Figs. 9 and 10.

The numeral 1 indicates a sound box casing, provided with a central sound exit opening 2, and a peripheral flange 3. Inside flange 3, the casing is formed with an annular depression 4, and in the periphery of the flange is a transverse recess 5. Fitting in the casing is a felt or paper washer

6. and bearing on the washer is a dished diaphragm 7. A washer 8 bears against the outer portion of the diaphragm, and contacting with said washer is a spider 9, the center of which is solid to form an abutment 10. Bolted to the front portion of the flange 3, is an open frame 11, formed with a central threaded opening 12, through which passes a screw 13, which engages the abutment 10, to adjust the diaphragm.

Mounted on the screw is a pointer 14, having a notch 15, in which fits a lug 16, formed on the screw. The pointer moves over a scale 17, on the frame, and is limited in its movement by a stop 18.

When the screw 13 is adjusted it impinges on the abutment 10, and causes the spider to clamp the diaphragm between the washers, to a greater or less degree, as may be desired. Because of the annular groove 4, the outer edge of the washer 6, will be forced or crowded into said groove, and correspondingly the outer edge of the diaphragm will yield and thereby the character of the reproduction will be altered. When the screw is adjusted, the pointer and scale will indicate the degree of pressure on the diaphragm.

Mounted and secured in the recess 5, is a substantially flexible fin 20, which projects from the lower portion 21, of a stylus lever 22. The lower portion 21, of the stylus lever is thickened and in its front face is a longitudinal groove 23, and intersecting this groove is a threaded opening 24. Fitting in the groove 23, is a gib 25, formed on its front edge with two lugs 26, and its rear edge is curved somewhat in the form of an ogee curve to provide an upper bearing point 27, and a lower bearing point 28. The bearing points 27 and 28 clamp the wire 30, against the inner wall of the groove 23, as will be explained later on.

It is of course to be understood that the upper end 31, of the stylus lever is attached to the diaphragm.

Preferably integral with the frame 11, is a cylindrical casing 32, having a slot 33 in the peripheral wall, the casing having an extended wall 34, which with the slot 33, and the groove 23, forms a guide for the wire 30. Fitting in the casing 32, is a drum 35, in the periphery of which is a groove 36, and in this groove is wound the wire 30. The inner end of the wire is bent and engages in a notch 36^a formed in the flange of the drum 35. Extending from the drum is a knurled knob 38, by means of which the drum may be rotated.

Fastened to the casing 32, by a screw 39, is a resilient bifurcated plate 40, which frictionally bears against the front face of the drum to hold the latter against accidental rotation.

The wire 30 is wound around the periphery of the drum, and is housed in the casing 32, the free end of the wire passing through

the slot 33, thence through the groove or recess 23, as clearly shown in the drawing.

A screw 42, engages the threaded opening 24, in the lower section 21, of the stylus lever, said screw fitting in between the lugs 26 of the gib 25, to hold said gib in position in the recess 23. Extending from and integral with the screw 42, is a V shape gage 43, which is rotated with the screw. The free end of the gage 43 is bent to contact with the lower end of the stylus lever and thereby limit its movement, as shown in dotted lines in Fig. 3. The gage, when in operative position is spaced from the bottom of the stylus lever so that the wire 30 can only be fed beyond the end of the stylus lever a definite distance.

The screw and the gage are so arranged that when the screw is rotated to clamp the gib 25, the gage will be out of the path of the needle, as shown in full lines in Fig. 3. Obviously, when the screw is withdrawn from its opening, to release the clamp from the wire, the gage will assume position under and in the path of the end of the wire; thus the movement of the screw produces a dual function.

Clamped around the sound conveyer, adjacent the sound box is a band 50, the ends of which are perforated and receive a screw 51. Extending from the band is an arm 52, which is turned down and spreads out in semi-circular form to provide a resilient plate 52^a, which engages over the face of a disk 53, adjustably fastened to the end of the horizontal portion of the swinging neck 54 by a set screw 56. One end of the plate 52^a, is bent outwardly as at 58, to form a gradual incline. Projecting outwardly from the disk 53, is a short pin 59, which, when the swinging neck 54 is elevated, rides up behind the inclined end 58, of plate 52^a and the friction of the latter holds the sound box in any position, and thereby prevents the sound box falling and the needle destroying a record. The pin 59 is spaced slightly from the end 58, of the plate 52^a, so as to permit free movement of the sound box while the needle is traveling in the record groove. Obviously, by adjusting the screw 56, the disk 53, may be rotated and then set to regulate the relative position of the pin 59, to the end 58, of the plate 52^a.

In operation, the parts are assembled as illustrated in Fig. 1. Now when the record is being reproduced, the needle can follow in the groove in precisely the same way, as practised with machines of this type. If the sound box be elevated, the pin 59 is so positioned that it will not be immediately frictionally bound by the plate 52^a, but when the stylus is a short distance above the record, the friction between the pin and plate 52^a, is such that it will hold the sound box against falling, if the operator should re-

lease it. In lowering the sound box the friction will prevent any undue or sudden engagement of the stylus with the record.

As regards this feature, it may be said at this point that the frictional engagement of the plate 52^a, may be adjusted by regulating the screw 51.

If the stylus be worn, and it be desired to feed the wire, the sound box is thrown up away from the record, and then the set screw 42 is rotated, which releases pressure on the gib 27, and the points 27 and 28, release the wire in the recess. As has been previously stated, the releasing of the screw 42, turns the gage under the lower end of the stylus lever and in the path of the wire, the proper position of the gage being determined by the lug 43^a. Now the thumb piece 38, is turned and the drum feeds the wire through slot 33, and the recess 23, until the end of the wire contacts with the gage. Then the set screw 42, is again tightened, and the reproduction can be proceeded with.

The resilient plate 40 serves to hold the drum in set position, and prevents the wire being fed toward the gage too freely.

In the form of the invention illustrated in Figs. 9 to 11, the wire gage 60, swings freely on a pin 61, supported on the stylus lever 62. The gage in this instance is of U form and is provided with a lug 63, which is adapted to contact with the lower end of the stylus lever to limit the movement of the gage in one direction, but the gage normally lies in the path of the projecting wire, and it serves to limit the feeding of the wire in substantially the same manner as the gage shown in the previous figures.

In this form of the invention, the stylus lever is somewhat different from that previously described, and the casing 32, is omitted, as the drum is dispensed with. The wire lies in a recess 64, in the stylus lever, and is clamped by a gib 65, and a screw 66, but the gage, as previously set out, is not attached to the screw. The wire 67 extends up beyond the lower section of the stylus lever, and may be turned over at its end.

In this embodiment of the invention, the screw is released, and the wire may then be pushed down in the groove until the gage is reached.

It is to be noted that the gage normally extends across the plane of the end of the stylus lever, the lug 63 supporting the gage in this position. Hence when the sound box is lowered toward a moving record the gage will lie across the path of the stylus, as shown in Fig. 10. Then the rotating record moving in the direction of the arrow *a* in Fig. 9, swings the gage on its pivot and moves it from under the stylus lever, and the end of the wire (or stylus) will gently drop into the groove.

By the construction described, I am en-

abled to use a very fine wire, which will insure of fitting the smaller undulations, thus obtaining the minor tones, which are usually lost when a coarse or large needle is employed.

Then again, because of the means described for preventing the sound box dropping, the end of the fine wire is protected.

What I claim is:—

1. In a sound box, the combination of a casing, including a stylus lever, a housing on the casing, a drum rotatively mounted in the housing, a wire wound around the drum and extended through and beyond a portion of the stylus lever, and means for gaging the movement of the wire.

2. In a sound box, the combination of a casing, a stylus lever having a recess and supported by the casing, a magazine mounted on the casing, a wire housed in the magazine and extending through the recess in the stylus lever, and a gib engaging the wire in the recess, and means for binding the gib to clamp the wire.

3. In a sound box, the combination of a casing, a stylus lever supported by the casing, a magazine mounted on the casing, a wire coiled in and housed in the magazine, the free end of the wire passing through a portion of the stylus lever, means for clamping that portion of the wire extending through the stylus lever, and means for feeding the wire beyond the stylus lever to form a needle.

4. In a sound box, the combination of a casing, a stylus lever supported by the casing, a magazine mounted on the casing, a wire coiled in and housed in the magazine, the free end of the wire passing through a portion of the stylus lever, means for clamping that portion of the wire extending through the stylus lever, means for feeding the wire beyond the stylus lever to form a needle, and a gage pivotally mounted on the stylus lever and adapted to swing below the latter to gage the feeding of the wire, the gage having a stop to limit its swinging movement.

5. In a sound box, the combination of a casing, a stylus lever carried by the casing, a drum, a wire wound around the drum and extending through a portion of the stylus lever and extending beyond the same, a frictional device for holding the drum in set position, and means for clamping that portion of the wire extending through the stylus lever.

6. In a sound box, the combination of a casing, a stylus lever carried by the casing, a drum, a wire wound around the drum and extending through a portion of the stylus lever and extending beyond the same, a frictional device for holding the drum in set position, means for clamping that portion of the wire extending through the stylus

lever, and a gage for gaging the movement of the wire.

7. A sound box comprising a casing, a stylus lever supported by the casing, a magazine on the casing including a drum having a flange provided with a wire receiving opening, a wire having its end fitting in the opening and wound around the drum and passed through a part of the stylus lever, and means for clamping that portion of the wire extending through the stylus lever.

8. In a sound box, the combination of a casing, a stylus lever supported on the casing and provided with a wire passage, a rotary magazine including a drum supported on the casing, a wire wound on the drum and passed through the passage in the stylus lever and projecting beyond the latter, means for holding the magazine in adjusted position, and means for clamping the wire in the passage in the stylus lever.

9. In a sound box, the combination of a casing, a stylus lever supported on the casing and provided with a wire passage, a manually operated rotary magazine including a drum supported on the casing, a wire wound on the drum and passed through the passage in the stylus lever and projecting beyond the latter, means for holding the manually operated magazine in adjusted position, and means for clamping the wire in the passage in the stylus lever.

10. In a sound box, the combination of a casing, a stylus lever supported on the casing and provided with a recess, a gib having two contact projections on one edge and fitting in the recess, a stylus extending through the recess and engaged by the projections, means on the stylus engaging the outer edge of the gib to force the projections against the stylus and clamp the latter against the rear wall of said recess, and means movable in the path of the free end of the stylus to engage the portion extending beyond the stylus lever.

11. In a sound box, the combination of a casing, a stylus lever supported on the casing to support an elongated stylus, a swinging gage movable in one direction under the stylus lever to be engaged by the free end of the elongated stylus to limit its length, the gage having a projection to limit its movement in one direction, and a screw to which the gage is attached whereby to move said gage in and out of gaging position and to fasten the stylus in the stylus lever.

12. In a sound box, the combination of a casing, a stylus lever extending from the casing, an elongated resilient stylus extending through the stylus lever, a rotary support on the casing for the resilient stylus, means for operating the rotary support to feed the stylus, a gage adapted to be moved under the stylus lever and against which the free end of the stylus contacts, and means for tightening the stylus after being gaged.

13. In combination with a sound-box, a stylus-wire and a rotatable part on which the wire is wound and by which it is adjustable, the stylus bar, and means for operatively securing the free end of the wire to said bar.

14. In combination with a sound-box, a stylus-wire and a rotatable part on which the wire is wound and by which it is adjustable, the stylus bar, and means for clamping the free end of the wire to said bar.

15. In combination with a sound-box, the stylus bar, stylus clamping means on said bar, a stylus wire passing through said clamping means, and a rotatable part on which said wire is wound and by which the extent of its projection from said clamping means is adjustable.

16. In combination with a sound-box, a stylus-wire and a rotatable part on which the wire is wound and by which it is adjustable, and means for securing one end of said wire to the rotatable part, the stylus bar, and means for operatively securing the free end of the wire to said bar.

17. In combination with a sound-box and its stylus bar, of a stylus-wire, the stylus bar having a clamp-controlled eye for operatively receiving one end of said wire, and a rotatable part on which the wire is wound and by which it is deliverable opposite the eye of the stylus bar.

18. In a sound box, the combination of a casing, a stylus lever having a seat for a stylus wire and supported by the casing, a magazine mounted on the casing, a wire coiled in the magazine and extending through and beyond the seat in the stylus lever to form a needle, and means on the stylus lever for clamping the wire in its seat.

19. In combination with a sound box, a stylus wire, and a rotatable part on which the wire is wound entirely around same, by which it is adjustable.

20. In combination with a sound box, a stylus wire and a rotatable part on which the wire is wound and by which it is adjustable, the rotatable part having a groove wherein the wire is located.

21. In combination with a sound box, a stylus wire and a rotatable part on which the wire is wound and by which it is adjustable, the stylus bar, and means for operatively securing the free end of the wire to said bar, the rotatable part having a groove wherein the wire is located.

22. In combination with a sound box, the stylus bar, stylus clamping means on said bar, a stylus wire passing through said clamping means, and a rotatable part on which said wire is wound and by which the extent of its projection from said clamping means is adjustable, the rotatable part having a groove wherein the wire is located.

23. In combination with a sound box, a

stylus wire, and a rotatable part on which the wire is wound and by which it is adjustable, and means for securing one end of said wire to the rotatable part.

5 24. In combination with a sound box, a stylus wire and a rotatable part on which the wire is wound and by which it is adjustable, the rotatable part having a groove wherein the wire is located, said groove
10 having a socket leading therefrom adapted to anchor the wire at one end.

25. In combination with a sound box, the stylus bar, a stylus wire, means for operatively securing the free end of the wire to
15 said bar, and a grooved rotatable part wherein the wire is located.

26. In combination with a sound box, the stylus bar, a stylus wire, means for operatively securing the free end of the wire to
20 said bar, and a grooved rotatable part to which the other end of the wire is attachable with the wire located in said groove.

27. In combination with a sound box and its stylus bar, of a stylus wire, the stylus bar
25 having a clamp controlled eye for operatively receiving one end of said wire, and a grooved rotatable part to which the other end of the wire is attachable with the wire located in said groove and by which it is deliverable opposite the eye of the stylus bar.
30

28. In combination with a sound box, a stylus wire, a stationary cylindrically hollow casing having a hole through it to deliver one end of said wire into an operative
35 playing position, and a rotatable and endwise movable spool within said casing about which the wire is wound and by which it is adjustable through the hole in said hollow casing.

29. In combination with a sound box and
40 its stylus bar, of a stylus wire, the stylus bar having a clamp controlled eye for operatively receiving one end of said wire, a stationary cylindrically hollow casing having a hole through it to deliver said end
45 of the wire opposite said eye, and a grooved rotatable and endwise movable spool within said casing to which the other end of the wire is attachable with the wire located in said groove and leading through said hole.
50

30. In combination with a sound box, a stylus wire and a rotatable part on which the wire is wound and by which it is adjustable, the rotatable part having a groove wherein the wire is located, and a cooperating
55 stationary part adjacent to said rotatable part, the side walls of the groove in the rotatable part being substantially normal thereto.

31. In combination with a sound box, a
60 stationary cylindrically hollow casing having a hole through it to deliver one end of the wire into an operative playing position, and a grooved rotatable and endwise movable spool within said casing to which the
65 other end of the wire is attachable with the wire located in said groove and leading through said hole in the spool casing, the side walls of said groove in the rotatable spool being substantially normal to the
70 cylindrical surface thereof.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY C. MILLER.

Witnesses:

JAMES W. ATKINSON,
E. F. JELF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

FILM CONTROL MECHANISM FOR MOTION PICTURE AND SOUND
REPRODUCING MEANS.

1,254,436 ----- H. W. Rogers,
Patented Jan. 22, 1918,
Filed Sept. 25, 1916.

H. W. ROGERS,
 FILM CONTROL MECHANISM FOR MOTION PICTURE AND SOUND REPRODUCING MEANS.
 APPLICATION FILED SEPT. 25, 1916.

1,254,436.

Patented Jan. 22, 1918.
 3 SHEETS—SHEET 1.

Fig. 1.

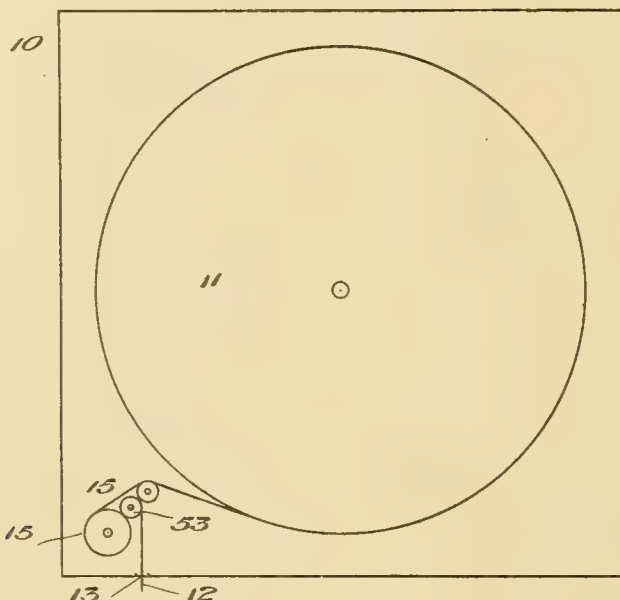


Fig. 3.

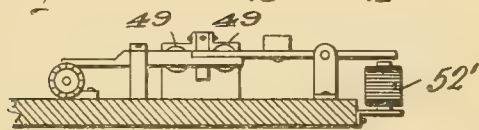
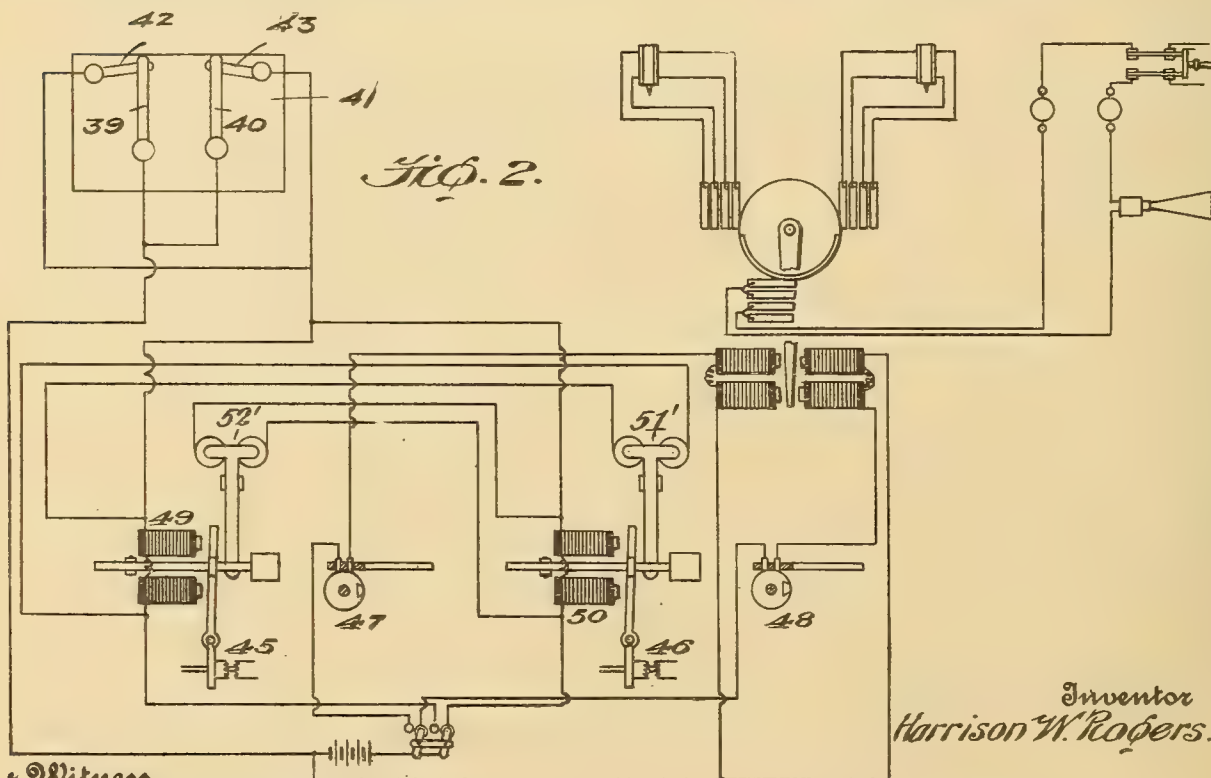


Fig. 4.



Fig. 2.



Inventor
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Witness

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384

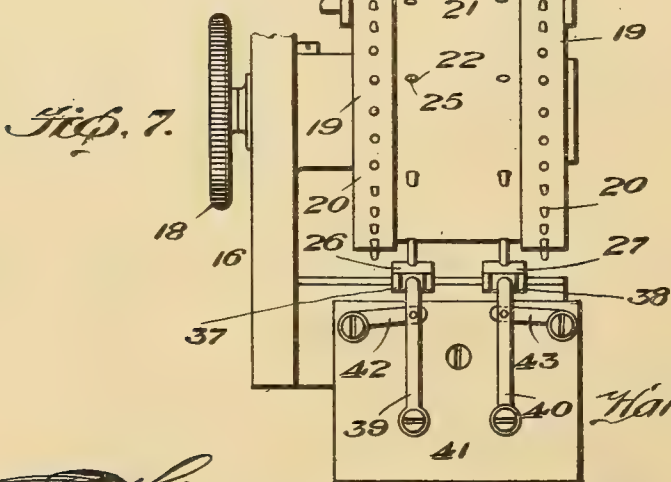
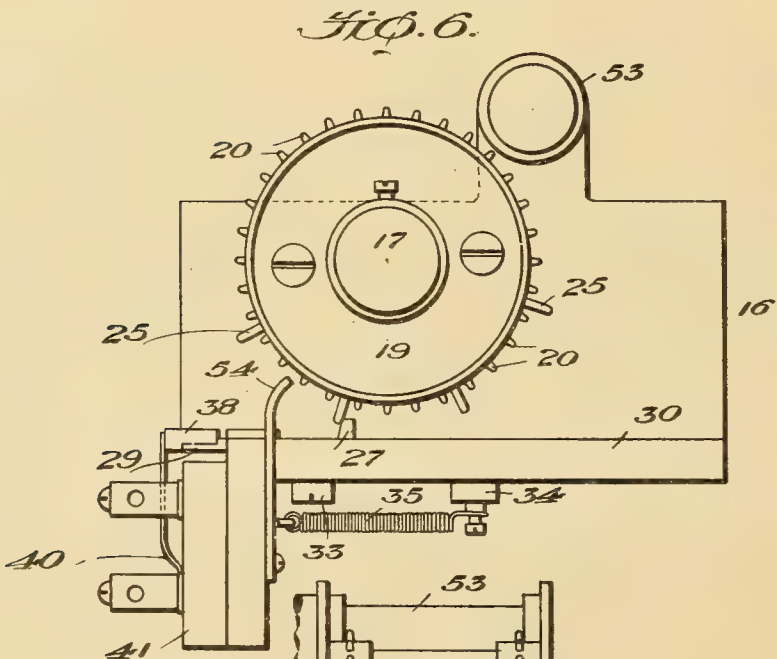
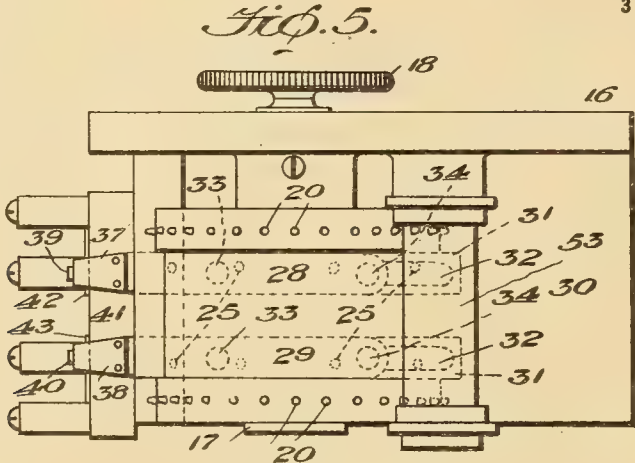
David Moore

Attorney

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1,254,436.

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 3 SHEETS—SHEET 2.



Witness
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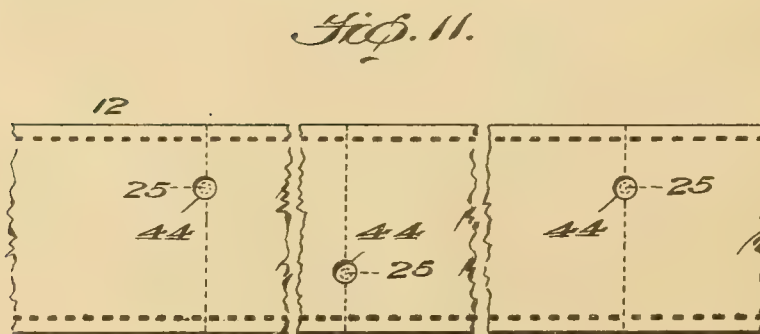
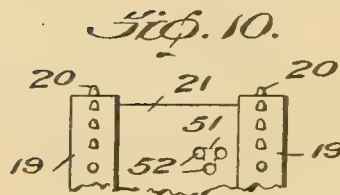
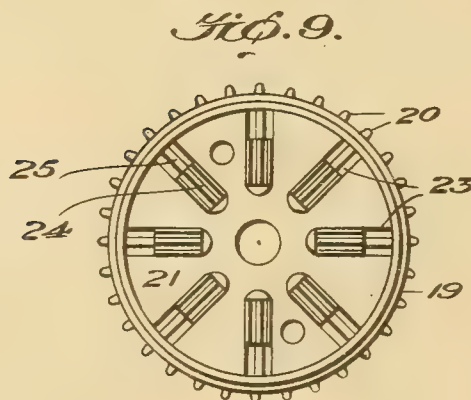
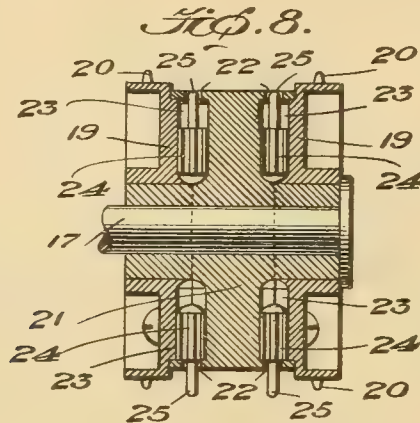
Inventor
Harrison G. Rogers
 By *David Moore*
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H. W. ROGERS.
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 APPLICATION FILED SEPT. 25, 1916.

1,254,436.

Patented Jan. 22, 1918.

3 SHEETS—SHEET 3.



Witness

C. T. Bradley

By

Harrison W. Rogers
 Inventor

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UNITED STATES PATENT OFFICE.

HARRISON W. ROGERS, OF NEW YORK, N. Y.

FILM-CONTROL MECHANISM FOR MOTION-PICTURE AND SOUND-REPRODUCING MEANS.

1,254,436.

Specification of Letters Patent.

Patented Jan. 22, 1918.

Application filed September 25, 1916. Serial No. 122,028.

To all whom it may concern:

Be it known that I, HARRISON W. ROGERS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Film-Control Mechanism for Motion-Picture and Sound-Reproducing Means, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a means whereby the film or motion picture projection machine automatically controls the connection and disconnection of a sound reproducing mechanism, so that the operation of the two will be in synchronism as set forth in my co-pending application, filed February 7, 1913, Serial No. 746,890, one object of the present invention being the provision of a means whereby the film is not subjected to any undue strains that will tend to break the same, but by means of which the operation of the connecting and disconnecting of the mechanisms is made positive.

A further object of this invention is the provision of a device of this type which is readily connected to the film magazines of the various motion picture projectors now in use without interfering with the use of the machines for the projection of silent pictures, but which can be readily converted by the passage of the film through the present device for producing synchronously with the pictures, sound, such as talking, singing, and music, or other noises.

Up to the present time there have been devised many ways of operating varying film clutch mechanisms or electrical devices that insure the setting in motion at the proper instant of sound reproducing mechanism, some of them embodying operators in the films through which electrical contact is made, the film acting as an insulator, projections or buttons carried by the film that must pass between tensioned rollers that control switches which also has a tendency to tear the film after continued usage and also the carrying by the body of the film of magnetic metal to attract the magnetic device upon the switch to close the clutch operating circuit.

These devices all have faults in that in some cases the contact is not maintained sufficiently long to insure of the operation of the clutch, while in other cases the life of the film is impaired.

In the present instance, the film is passed around a rotating drum which is provided with a plurality of radially slidable pins, the film being provided at the proper intervals with openings of larger area than the pin or pins, so that by gravity or in some instances, assisted by magnetism, the pins are projected through the opening in the film, and by the movement of the film, such pin is brought into contact with a switch closing device, so that a positive actuation of the switch without strain upon the film is produced.

With the foregoing and other objects in view and which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made without departing from the spirit of the invention.

In the accompanying drawings:—

Figure 1 is a diagrammatic view of one type of film mechanism showing the present switch controlling device mounted therein.

Fig. 2 is a diagrammatic view showing the clutch throwing mechanism, the present switch controlling device, and the electrical connections thereof.

Figs. 3 and 4 are detail views of one method of operating the clutch for connecting and disconnecting the sound reproducing means.

Fig. 5 is a top plan view of the switch controlling device *per se*.

Fig. 6 is a side elevation thereof.

Fig. 7 is an end view taken from the left as seen in Fig. 6.

Fig. 8 is a cross sectional view through the pin carrying member.

Fig. 9 is a detailed end elevation of said member with one of the disks removed.

Fig. 10 is a detailed fragmentary view of a modified form of pin carrying member.

Fig. 11 is a plan view of portions of a film showing the location of the openings therein, dotted lines illustrating the position of the pins when seated in such openings.

Referring to the drawings, the numeral 10 designates the magazine for the projector mechanism which may be taken as indicative of any magazine now in use, there being mounted therein as usual the film reel, 11, so that the film 12 under ordinary condi-

tions will pass through the guide opening 13 to the projector mechanism 14.

In this instance, mounted in one corner of the magazine is the switch controller 15, the detailed construction of which will now be set forth. This switch control mechanism includes the supporting structure 16 having rotatably mounted therein the shaft 17 provided with the operating or milled wheel 18, by means of which the shaft may be rotated manually to insure the proper starting position of the parts relatively to the film.

Connected to the shaft are the two end disks 19, each one of which is provided with teeth 20 for receiving the sprocket openings of the film 12. Detachably connected to and between the disks 19 is a cylinder 21 which is provided with a plurality of pairs of openings 22, while formed within the cylinder or drum are the radial grooves 23 which co-operate with the radial grooves 23' of the disks 19 to form radial pockets.

Mounted in each of these pockets for radial sliding movement is a fluted guide stem 24 for the pin 25, the same being of such a combined length as to normally be within the peripheral way of the cylinder or drum when retracted, but to be projected by gravity so as to be placed in the path of the respective lugs 26 and 27 carried by the respective slidable plates 28 and 29, which are mounted upon the horizontal shelf 30 of the support 16 in grooves 31.

Two parallel slots 32 are also provided in the shelf 30 below the grooves 31 and projected therethrough are the holding pins 33 and 34 for the members 28 and 29, the respective springs 35 being connected as illustrated to normally hold the members 28 and 29 so that the blocks 37 and 38 will engage the resilient switch members 39 and 40 mounted upon the block 41 of insulation so as to hold them out of contact with the fixed contacts 42 and 43.

The film 12, as clearly illustrated, is provided with a plurality of openings 44 which, as the same comes in line with any of the respective pins of the drum, will permit such pin to fall by gravity as such pin bridges the shelf 30 and into the path of either one of the lugs 26 or 27, according to which switch controlling plate 28 or 29 is to be operated, said switches being adapted to control each clutch mechanism 45 or 46, whereby either one of the sound reproducing means 47 or 48 is connected for synchronous operation with the motion picture projector. These openings in the film are of such a diameter that the pin never engages the edge thereof, so that there is no wear or tear placed upon the body of the film, and a positive actuation of either one of the members 28 or 29 is assured so that the respective switches are positively controlled and of a sufficient length of time to insure the

actuation of the respective clutch throwing solenoids or electro-magnets 49 and 50. Connected in circuit with the electro-magnet 49 is the clutch releasing magnet 51', while connected in circuit with the clutch throwing electro-magnet 50 is the clutch releasing electro-magnet 52', this construction being especially desirable when two sound reproducing machines, as illustrated in Fig. 2, are to be operated one at a time. Thus the switch 37—42 controls the energization of the electro-magnets 49—51', while the switch 40—43 controls the energization of the electro-magnets 50—52'.

As shown in Fig. 10, instead of circular openings in the drum, the T-shaped openings 51 are provided, each radially slidable member in this instance being provided with a plurality of pins 52 for projection through said openings and for actuating the switch controlling members 28 and 29.

Carried by the support 16 at such a point as to properly guide the film away from the drum and particularly after the resistance pins have been withdrawn within the drum so no tearing action or pull would be given to the film, is the guide pulley 53.

Should auxiliary means for assisting in the projection of the pins be necessary, the members 16 and the parts carried thereby will be made of non-magnetic metal, so that the horse shoe magnet 54 may be so disposed as to attract the respective pins through the aligned opening of the film so that the pin will be projected into the path of to engage its respective lug.

With the circuit arrangements, as shown in Fig. 2 and it being assumed that the apparatus is being operated so that one of the sound reproducing machines is being driven, the electro-magnet 49 having been energized to operate its clutch 45 while the electro-magnet 51' had been energized to assist in releasing the clutch 46, should the film break the passage of the broken portion of the film below the drum will permit the projection of two of the pins 25 so that both of the lugs 26 and 27 will be engaged and moved to in turn permit the simultaneous closing of the switches 39—42 and 40—43. This action will cause the simultaneous energization of all of the electro-magnets 49, 51', 50 and 52' and consequently the effect upon the two clutches 45 and 46 will be such as to permit the opening thereof and thus the disconnection of both of the sound reproducing machines from the driving mechanism. In other words, instead of both machines being connected for operation at the same time, both clutches would be permitted to open if all four of the electro-magnets were energized simultaneously, which would be the case due to the breakage of the film.

It is also apparent that when the body of

the film is passing around the drum, the pins will be held from projection, and that it will be absolutely necessary for one of the openings to be in alinement with the film to permit such projection.

It will be noted that the openings in the film are placed near the center and on the marginal lines between the pictures, those upon the left of the center being provided to control the operation, as for instance, of the member 28, while those upon the right will control the operation of the member 29 of the switch controller.

It is also apparent that where desired and found necessary, a successive number of these openings may be provided to insure the closure of the respective switches a sufficient interval of time and the consequent positive action of the clutch.

By fluting or corrugating the stems 24, a free sliding movement within the pockets of the pin carrying member without creating a vacuum is permitted.

What I claim as new is:—

1. The combination with a motion picture projector machine and a sound reproducing machine, of mechanism for connecting the two for synchronous operation including a film, provided with an opening therein, a rotatable drum about which the film passes and through the medium of the film is operated, a plurality of radially slidable pins carried by the drum for projection through the respective opening of the film, and a switch operating member disposed in the path of the pins and adapted to be operated by a projected pin.

2. The combination with a motion picture projector machine, a sound reproducing machine, and a transmission mechanism between the two, of means for controlling the transmission mechanism for connecting the two for synchronous operation, including a film, provided with an opening therein, a rotatable drum about which the film passes and through the medium of the film is operated, a plurality of radially slidable pins carried by the drum for projection through the respective opening of the film, and a switch operating member disposed in the path of the pins and adapted to be operated by a projected pin.

3. The combination with a motion picture projector machine, a sound reproducing machine, and a transmission mechanism between the two, of means for controlling the transmission mechanism for connecting the two for synchronous operation, including a film provided with an opening therethrough, a rotatable drum, a plurality of radially slidable pins for projection within and beyond the periphery of the drum, an electrical circuit having a source of electrical energy, a clutch throwing electrical device,

a switch, and means operably connected to the switch and disposed in the path of a projected pin for actuating the switch to energize the clutch throwing electrical device.

4. The combination with a motion picture projecting machine, a sound reproducing machine, and transmission mechanism between the two and having a clutch, of electro-magnetical means for actuating the clutch and including a film provided with an opening, a rotary drum about which the film passes, a plurality of radially slidable pins carried by the drum and adapted to be retracted within and projected beyond the periphery of the drum, said pins being adapted when in alinement with the opening of the film to be projected, an electrical device for controlling the clutch, a source of electrical energy, a switch, a circuit including said switch, a source of electrical energy and said clutch operating device, and means disposed in the path of the pin when projected for actuating the switch to energize the clutch throwing device.

5. The combination with a motion picture projecting machine, a sound reproducing machine, and transmission mechanism between the two and having a clutch, of electro-magnetical means for actuating the clutch and including a film provided with an opening, a rotary drum about which the film passes, a plurality of radially slidable pins carried by the drum and adapted to be retracted within and projected beyond the periphery of the drum, said pins being adapted when in alinement with the opening of the film to be projected, an electrical device for controlling the clutch, a source of electrical energy, a switch, a circuit including said switch, a source of electrical energy, and said clutch operating device, a slidable member having a projection disposed in the path to be engaged by a projected pin, and means carried thereby for controlling the switch.

6. A film controlled switch actuated device including a support, a film rotated drum carried thereby, a plurality of radially slidable pins carried by the drum for retraction therewithin and projection beyond the periphery thereof, a normally open switch, a slidable member mounted in the support, a spring for engaging the same to normally hold the switch open, and a projection carried by the slidable member and disposed in the path to be engaged by a projected pin for operating the slidable member in opposition to the spring to permit the closure of the switch.

7. A film controlled switch actuated device including a support, a rotatable drum carried thereby and adapted to be rotated by the film, a plurality of radial sleeves mounted within the drum, a plurality of

radially slidable pins mounted in the sleeves for retraction within and projection beyond the periphery of the drum, and a switch controller disposed in the path to be engaged by a projected pin.

8. A film controlled switch actuated device including a support, a rotatable drum carried thereby and adapted to be rotated by the film, a plurality of radial sleeves mounted within the drum, a plurality of radially slidable pins mounted in the sleeves for retraction within and projection beyond the periphery of the drum, and a switch controller disposed in the path to be engaged by a projected pin, said controller including a slidable plate mounted in the support, a spring for normally holding the plate in one direction, and a lug carried by the plate to

be engaged by the pin, whereby the plate is moved in opposition to the spring.

9. The combination with a motion picture projector machine and a sound reproducing machine, a mechanism for connecting the two for synchronous operation, including a film, a rotatable member about which the film passes and which through the medium of the film, is operated, and coöperable switch operating means carried by the rotatable member and in the path thereof, said members being held out of operation by the film when the film is interposed therebetween and adapted to coöperate when released by the film.

In testimony whereof I affix my signature.

HARRISON W. ROGERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

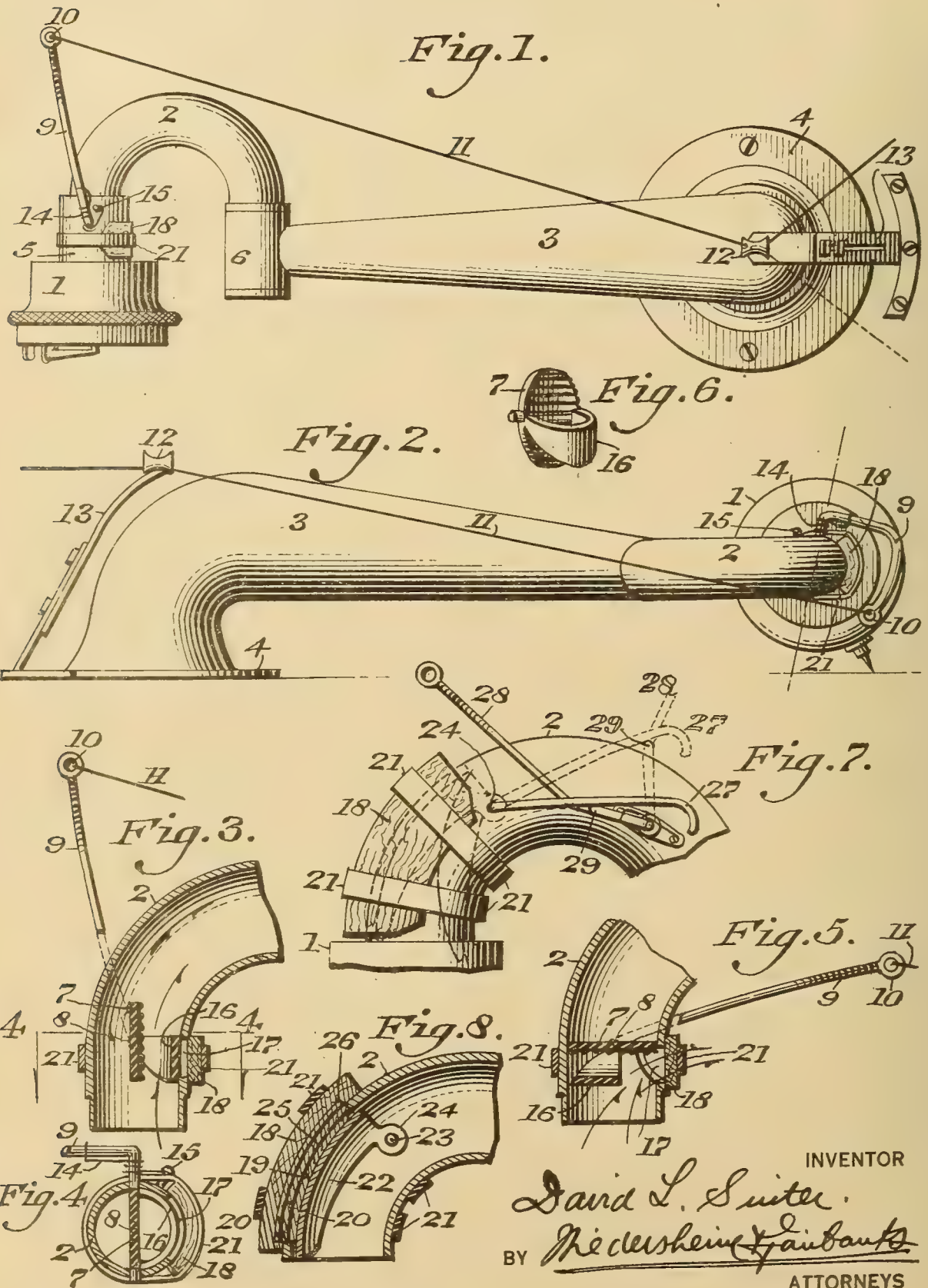
SOUND DAMPING DEVICE FOR TALKING MACHINES.

1,254,447 ----- D. L. Suiter,
Patented Jan. 22, 1918,
Filed June 13, 1917.

D. L. SUITER.
SOUND DAMPING DEVICE FOR TALKING MACHINES.
APPLICATION FILED JUNE 13, 1917.

1,254,447.

Patented Jan. 22, 1918.



INVENTOR
David L. Suiter.
BY Nedersheim & Gaubatz
ATTORNEYS

UNITED STATES PATENT OFFICE.

DAVID L. SUITER, OF PHILADELPHIA, PENNSYLVANIA.

SOUND-DAMPING DEVICE FOR TALKING-MACHINES.

1,254,447.

Specification of Letters Patent.

Patented Jan. 22, 1918.

Application filed June 13, 1917. Serial No. 174,418.

To all whom it may concern:

Be it known that I, DAVID L. SUITER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Sound-Damping Device for Talking-Machines, of which the following is a specification.

This invention relates to the class of devices which are applied to phonographs or talking machines of the type in which the record is a circular disk, and in which are embodied in connection with the casing a tone arm leading to the amplifier, carrying at its outer end a goose-neck deflectably applied to it and carrying at its end beyond its connection with the tone arm the sound-box.

My invention comprehends a means for modifying the sound by controlling and modifying the pitch and volume of sound while the instrument is being played, and it contemplates the application of sound modifying devices to the goose-neck as near as possible to the source of sound or the connection of the sound-box with the goose-neck.

My invention is an improvement upon a certain device of a generally similar character, which forms the subject of a pending application of mine filed upon the 24th day of October, 1916, Serial No. 127393.

In the foregoing application, I have applied to the outer end of the goose-neck very close to the attachment of the sound-box a disk-like or a butterfly valve, controlled by a lever externally connected with the valve axis or stem, which is controlled by an operating cord extending back from the outer extremity of the valve lever through a controlling eye on the axis of the connection of the inner end of the goose-neck with the outer end of the tone arm and then extending rearwardly through a throat or cord guide mounted in alinement with the axis of movement of the tone arm.

My present invention contemplates the employment of a valve applied closely to the rear of the sound-box and in the region of its connection with the goose-neck, in which the valve is not, as in my application referred to, merely a circular disk adapted, according to the deflection which is given to it, either to partly or completely close the entire tubular interior of the sound conduit, but is a disk to which is applied a tubular

closing plate which itself either partly or completely closes a lateral valve throat formed through the wall of the sound conduit.

My present invention also contemplates dispensing with the guiding cord eye on the axis of the connection of the goose-neck with the tone arm as in my application referred to, and so forming or bending and extending the valve-operating lever as to make it possible for the operating cord to extend from the outer free end of said lever rearwardly and directly into and through the throat or cord guide which is in alinement with and over the axis of the tone arm, without the possibility in the pull of said cord of deflecting the goose-neck and sound-box as an entirety with reference to the axis of connection of the goose-neck with the tone-arm.

With the foregoing primary objects in view, my invention comprehends a valve of the general character hereinafter described and claimed, which is applied within the sound-box end of the goose-neck and operates in its deflection to open or close a valve throat formed laterally through the walls of the goose-neck, or, if desired, through the walls of a tubular extension extending from the rear of the sound-box and fitted to be locked upon the outer end of the goose-neck in the manner well understood in talking machines of the character to which my invention relates.

My invention further comprehends the application to the exterior of the valve throat referred to, of a sound-absorbing or sound-dampening substance, which occludes the valve throat and serves when the valve is open to dampen such volume of sound as may emerge through the valve throat laterally into the atmosphere and not be wholly carried through the goose-neck, tone arm and amplifier.

My invention further comprehends the details of construction and arrangement represented in the accompanying drawings and hereinafter described and claimed.

For the purpose of illustrating my invention, I have shown in the drawings types and embodiments of it which are at present preferred by me because in practice they have given satisfactory and reliable results.

It is to be understood, however, that the various components in which my invention is shown as embodied, can be variously ar-

ranged, and that my invention is not, therefore, limited to the precise arrangement and organization of such components as are typified in the construction shown in the accompanying drawings and hereinafter described.

Figure 1 is a top plan view of a preferred embodiment of my invention as applied in connection with the tone-arm, goose-neck and sound-box of a typical talking machine.

Fig. 2 is a side elevational view of the construction represented in Fig. 1.

Fig. 3 is a fragmentary, central, sectional detail through that portion of the goose-neck to which my valve is applied,—the valve being shown in closed position in the sense that the tubular valve plate closes the valve throat and the plate carrying disk is in the position which permits the entire volume of sound to pass through the goose-neck.

Fig. 4 is a transverse, horizontal section on the dotted line 4—4 of Fig. 3.

Fig. 5 is a view similar to Fig. 3, illustrating, however, the valve in open position in the sense that all of the sound is deflected from the channel of the goose-neck, through the valve throat and against and through the sound deadening substance.

Fig. 6 is a perspective view of the valve as shown in Figs. 1 and 3, removed from the goose-neck.

Fig. 7 is a top plan view of a portion of the goose-neck, to which is applied a modified construction of my valve.

Fig. 8 is a sectional view of the goose-neck of Fig. 7 and of the modified form of valve applied thereto.

Similar numerals of reference indicate corresponding parts.

In the drawings,—

1 represents a typical sound-box, 2 a typical goose-neck, and 3 a typical tone-arm, which latter is mounted and swingable upon a base 4 applied in the usual manner to the motor-covering plate of the casing, upon which plate the record-carrying table is mounted.

5, in Fig. 1, designates a tubular bayonet-locking extension of the sound-box, which is fitted in the usual manner over the outer end of the goose-neck, the inner end of which latter is pivotally hubbed at 6 to the outer end of the tone-arm.

7 is a circular disk valve of external diameter slightly less than the internal diameter of the goose-neck, so that a close fit exists between the external periphery of the disk and the internal circumference of the neck. This disk valve is preferably corrugated across its inner face as shown and is mounted for turning upon an axis 8, which extends through and has its bearings within both walls of the goose-neck, and, in the construction shown, also through both adjacent walls of the sound-box extension 5. One

end of this axis is either itself extended so as to form, or has applied to it, a valve lever 9, which is bent to the form best indicated in Fig. 2, and at its outer end is provided preferably with a cord eye 10 to which is connected one end of an operating cord 11, which extends rearwardly and passes through a throat or cord guide 12 shown as conveniently mounted upon an adjustable bracket 13 springing from the casing,—but which may be mounted upon the upper head of the axis with reference to which the tone arm has its swinging movement.

The bracket illustrated is simply a convenient form of device to which I do not confine myself.

14 is a lever-controlling spring, preferably of spiral character, as to one end portion wrapped around the lower portion of the valve lever 9 and connected therewith, and as to its other end connected with the sound-box extension preferably by an attaching pin 15. The action of this spring is to retain the valve lever normally in the position shown in Figs. 1 and 3, in which the disk occupies the open position shown in Fig. 3.

Formed as a part of, or connected with, the disk valve is a tubular valve plate 16, as I term it, which possesses externally a cylindric form correspondent to the internal cylindric form of a wall of the goose-neck. Through this wall is formed a lateral valve throat 17, adapted to be completely closed by the tubular closing plate 16 of the valve when the disk and plate are in the position represented in Fig. 3, and adapted also to be entirely opened or freed from the valve plate when the disk is in the position represented in Fig. 5.

Superposed upon the tubular sound-box extension 5, or upon the outer end of the goose-neck when the valve throat is formed in it, is a mass or form of sound-deadening or sound-absorbing substance 18, the function of which, as already explained, is to modify the pitch and volume of the sound which passes laterally through the valve throat 17 when that throat is open by the deflection away from it of the tubular closing plate 16 of the valve through the action of the valve lever 9 into the position represented in Fig. 5.

This sound-deadening substance may be of any character,—for instance, a mass of felt or a composite of layers of felt and of tin foil. It is immaterial what the substance may be so long as it performs the function of sound-absorption or deadening.

It is further immaterial how the mass may be applied to encompass and occlude the valve throat. I find it convenient, however, to fasten it to the exterior of the throat, or around the exterior of the tubular extension 5 as shown in Fig. 1, or the outer

end of the goose-neck as shown in Fig. 3, by clamping bands 21 of brass or other material.

In Figs. 7 and 8, I have shown a modified form of valve which in effect is the tubular valve plate 16 of Figs. 3, 4, and 5, without or independent of the disk valve 7, and have marked it 22.

The mounting of this closing plate is by means of an axis that I have marked 23, which is fixedly hubbed through plate eyes 24.

In this construction, I have shown the valve plate 22 as externally coated or covered with sound deadening substance designated 25, which is conveniently formed or shaped to fill the valve throat 17, and which may be of such dimensions as also to fill a chambered recess 26 on the inner face of the valve-throat-occluding sound-deadening substance 18. This of course is a non-essential.

In this particular construction, one end of the valve axis 23 is extended to form or has connected with it an operating rod 27, Fig. 7, which extends rearwardly in such position as to overlap or overhang the valve-operating lever 28, which is bent to form a shoulder 29, which latter, acting against the operating rod when the lever 28 is thrown from the full line position of Fig. 7 to the dotted line position, serves to move the valve plate from the open position shown in Fig. 8, and to the left in Fig. 1, to the closed position shown to the right in Fig. 7. In other words, this form of valve which dispenses with the disk is the full equivalent of the combined construction, because in its own proper body it subserves all of the functions of the combined disk 7 and tubular closing plate 16 of the first construction.

From the foregoing description of the device as an entirety, the operation of opening and closing the valve in connection with a valve throat occluded by sound deadening substance will have been fully understood.

It will also be understood that the operation of the valve through the operating cord,—which can be effected by a person sit-

ting at a distance from the machine,—will effect the control of the tone of the instrument wholly at the will of the person operating the cord, and will always be such that no matter what the position of the tone arm or lever may be, the cord when pulled will always clear the goose-neck and always pass over a horizontal axial line through the rear of the goose-neck,—with the result that the cord cannot possibly alter the position of the sound-box.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a sound reproducing apparatus of the character recited,—the combination of a sound conduit having a valve throat opening laterally through it,—of a valve adapted to partly or entirely close the sound conduit and simultaneously partly or entirely open the valve throat,—sound-deadening substance occluding the exterior of the valve throat,—and means for controlling the valve.

2. In a sound producing apparatus of the character recited,—the combination with a sound conduit having a valve throat opening laterally through it,—of a valve consisting of a disk and a tubular closing plate so arranged with relation to the valve throat that when the closing plate uncovers the throat the disk closes the sound conduit,—and means for controlling the valve.

3. In a sound producing apparatus of the character recited,—the combination with a sound conduit having a valve throat opening laterally through it,—of a valve consisting of a disk and a tubular closing plate so arranged with relation to the valve throat that when the closing plate uncovers the throat the disk closes the sound conduit,—means for controlling the valve,—and a sound deadening substance occluding the exterior of said valve throat.

DAVID L. SUITER.

In the presence of—

J. BENSAN TAYLOR,
C. D. McVAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

FILM CONTROLLED MECHANISM FOR SYNCHRONIZED MOTION
PICTURE AND SOUND RECORD CARRIERS.

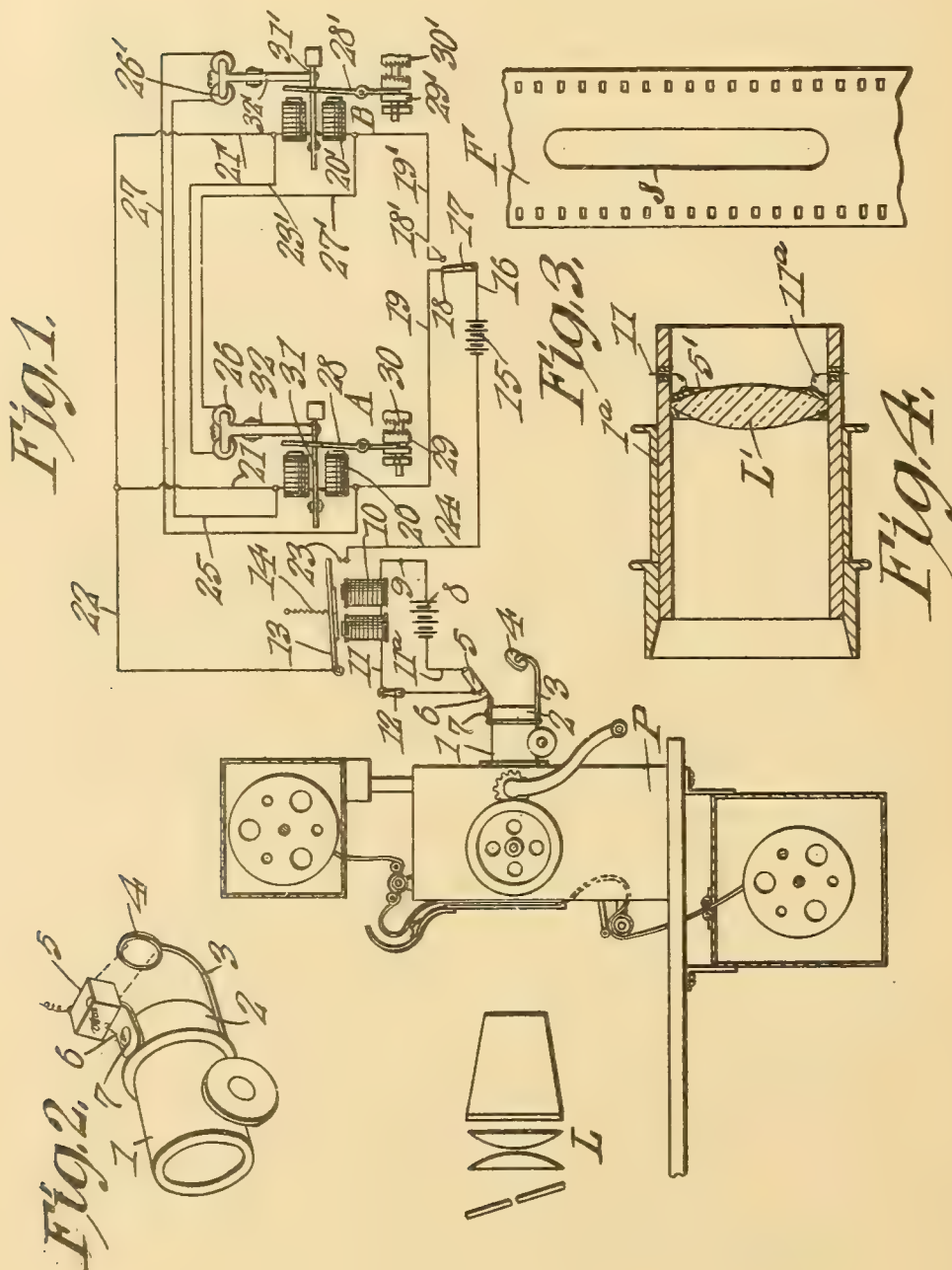
1,254,487 ----- C. W. Ebeling,
Patented Jan. 22, 1918,
Filed Nov. 18, 1916.

C. W. EBELING.
 FILM CONTROLLED MECHANISM FOR SYNCHRONIZED MOTION PICTURE AND SOUND RECORD CARRIERS.
 APPLICATION FILED NOV. 18, 1916.

1,254,487.

Patented Jan. 22, 1918.

2 SHEETS—SHEET 1.



Witnesses

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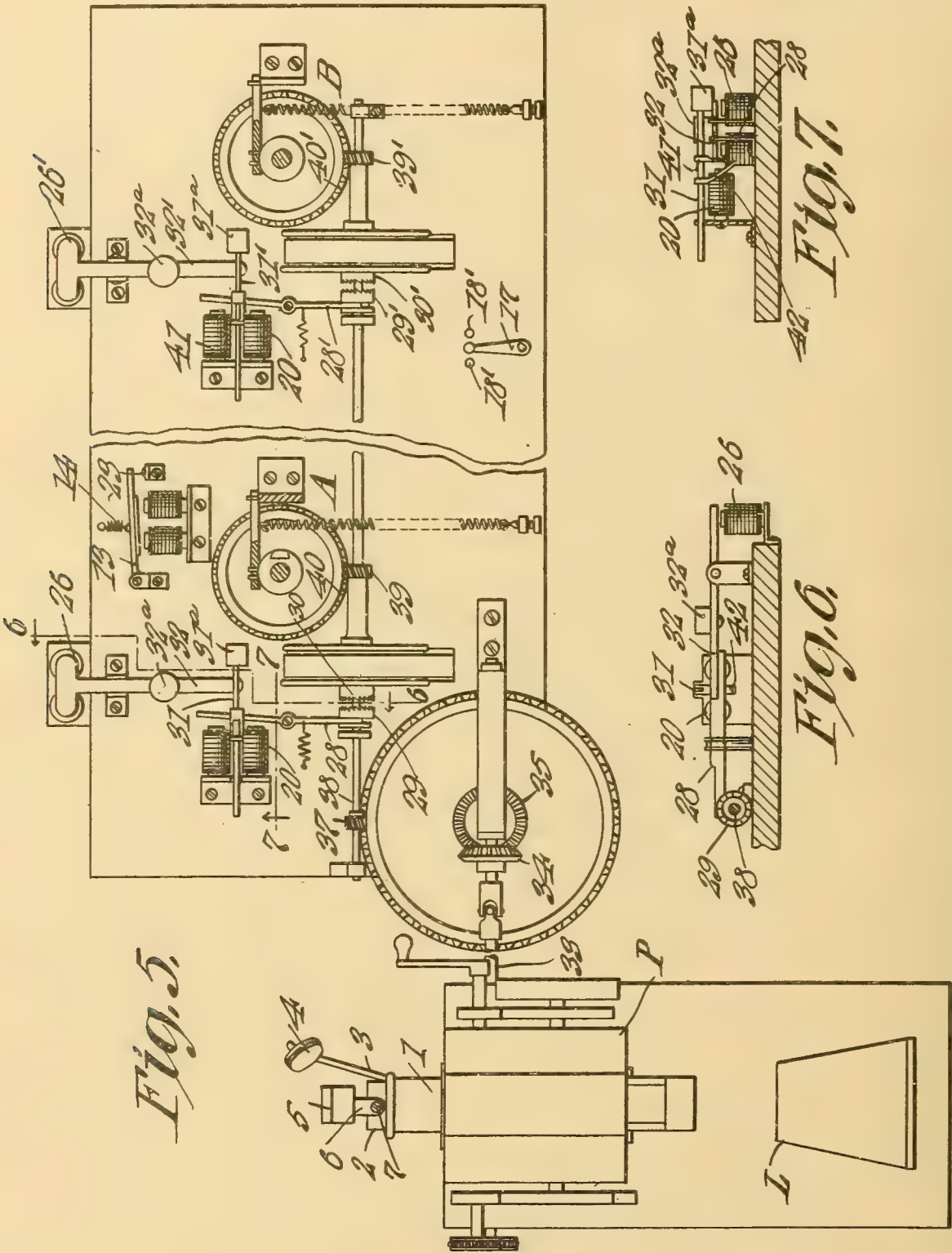
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C. W. EBELING.
 FILM CONTROLLED MECHANISM FOR SYNCHRONIZED MOTION PICTURE AND SOUND RECORD CARRIERS.
 APPLICATION FILED NOV. 18, 1916.

1,254,487.

Patented Jan. 22, 1918.
 2 SHEETS—SHEET 2.



Witnesses

J. R. Dorem
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UNITED STATES PATENT OFFICE.

CHARLES W. EBELING, OF WHEELING, WEST VIRGINIA.

FILM-CONTROLLED MECHANISM FOR SYNCHRONIZED MOTION-PICTURE AND SOUND-RECORD CARRIERS.

1,254,487.

Specification of Letters Patent.

Patented Jan. 22, 1918.

Application filed November 18, 1916. Serial No. 132,123.

To all whom it may concern:

Be it known that I, CHARLES W. EBELING, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Film-Controlled Mechanism for Synchronized Motion-Picture and Sound-Record Carriers, of which the following is a specification.

10 The present invention relates to improvements in film controlled mechanism for motion picture and sound reproducing machines, one object of the invention, being the provision of electrically operated clutch controlling means for determining the syn-
15 chronous operation of one or more sound record carriers relatively to a motion picture projector, a circuit including the electromagnetic clutches being primarily controlled by a
20 selenium cell which in turn has its resistance effected by the reflected rays of light from the motion picture projector, there being provided in the film an open slot or trans-
25 parent light ray unobstructing portion at the selected point for permitting the intense rays of light to be reflected to effect the selenium cell, the film under ordinary conditions preventing the rays from reducing the resistance to close the primary circuit.

30 A further object of this invention is the provision of a simple circuit controlling means adapted to be acted upon by the light rays projected from the lens of the motion picture projecting machine and which only
35 necessitates the attachment of the present device to the machine and the erasure from the film of a predetermined portion of the sensitized gelatin so that a transparent portion of the film is provided without weaken-
40 ing the film.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the
45 details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:—

50 Figure 1 is a diagrammatic view of a motion picture projector and the clutch operating electromagnets of two rotary sound
55 record carriers for sound reproducing ma-

chines showing the present selenium cell control in operable relation thereto.

Fig. 2 is a perspective view of the lens tube of a motion picture projector with the reflecting mirror and the selenium cell at-
60 tached thereto.

Fig. 3 is a plan view of a portion of the film showing one method of producing a transparent or light ray unobstructing space for the projection of the light rays there-
65 through to affect the selenium cell.

Fig. 4 shows a modified form of mounting the selenium cell within the lens tube.

Fig. 5 is a diagrammatic top plan view of a motion picture projector and a double
70 sound record carrier mechanism showing the present invention installed.

Fig. 6 is a section taken on line 6—6 of Fig. 5.

Fig. 7 is a section taken on line 7—7 of
75 Fig. 5.

Referring to the drawings, L designates diagrammatically, the lamp house of a motion picture projector machine P, which is provided with the lens tube 1 of usual construction, having attached at the under side to the forward portion thereof, the arm or
80 bracket 3 which carries the reflecting member or mirror 4, the same being disposed within the rays of light from the lens. It
85 has been found in practice, that this mirror has no detrimental effect upon the projection of the scene upon the screen even when placed in comparatively close proximity to the lens tube, as illustrated in Figs. 1 and 2. 90

The bracket 6 which carries the selenium cell 5, is attached by the screw 7 to the upper portion of the tube 1 and thus is out of the direct rays of light therefrom, the same, however, being disposed to receive the re-
95 flected rays from the mirror 4, so that the resistance of the cell 5 may be varied according to the reflected rays to close the following primary circuit.

This circuit includes the battery 8, the con-
100 ductor 9, the relay 10, the conductor 11 provided with the switch 12, the selenium cell 5 and the conductor 11^a.

In the present instance, there is shown diagrammatically in Fig. 1, two sound record
105 carrier controls A and B. The corresponding parts in the machine B are primed, so that the description of one will suffice for both.

The relay 10 controls its armature switch 110

13 which is normally held away from the relay by means of the spring 14.

As illustrated in Fig. 1, when the armature 13 is in contact with the contact point 23, the relay 10 being energized, the following circuit will be closed. This circuit includes the battery 15, the conductor 16 the hand controlled switch 17, the contact point 18, the conductor 19, the electromagnet 20, the conductors 21 and 22, the armature 13, the contact 23 and the conductor 24. Connected in multiple to the conductors 19 and 21 are the conductors 25 and 27, which permit the current to be distributed to the releasing electromagnet 26' of the machine B. Thus when the circuit including the battery 15 with the switch 17, as shown in Fig. 1 is closed, the clutch throwing electromagnet 20 of the machine A is energized, while the clutch releasing electromagnet 26' of the machine B is energized. Thus the machine B is disconnected from operation while the machine A is connected for operation, and vice versa.

When the switch point 17 is shifted to engage with the switch point 18', the electromagnets 20' and 26 are energized, thus throwing in the clutch of the machine B and throwing out the clutch in the machine A.

The armature 28, and the electromagnet 20 are operably connected to the slidable clutch member 29 which is disposed to cooperate with the clutch member 30 for operating the carrier of the machine A (not shown). The weight actuated lever 31 is disposed to lock the armature 28 in clutch thrown position, while the electromagnet 26 operates the armature 32 so as to release the weight actuated arm 31 and permit the armature lever 28 to return to clutch opening position.

The present mechanism which is shown merely diagrammatically, is set forth in detail and forms a part of a copending application Serial No. 873,548, filed November 23, 1914.

In order, however, that the present installation will be fully understood, the detail structure shown in Figs. 5, 6 and 7 is hereto referred to.

In this construction, the projector operates through the shaft 33, the bevel pinion 34, which in turn is in mesh with the bevel pinion 35 connected to and carried by the large worm gear 36. This worm gear 36 is so journaled as to mesh with the worm gear 37 and thus operate the drive shaft 38 of the two machines A and B.

As before described, the clutch members 29 and 30, and 29' and 30' are connected to the shaft 38 to in turn operate the driven worm gears 39 and 39', which in turn operate the record carrier actuating gears 40 and 40'.

As there illustrated, the armature 32 is

provided with the weight 32^a which normally holds the free end of the armature below the lever 31, which is actuated by the weight 31^a, there being attached to the lever 31, a locking member 41 and a returning member 42, such locking member being disposed in the path to lock the electromagnetically actuated clutch throwing lever 28—28' to hold the same in clutch closed position while the returning member 42 is carried thereby so as to operate the lever 28 when the lever 31 is elevated by the armature 32 due to the energization of the electromagnet 26—26'. Thus upon the energization of the electromagnet 20, the clutch is thrown in as the armature 28 is attracted, the free end of such armature being placed under the locking member 41 and due to the weight 31^a being held in such locked position with the clutch thrown in.

The film F, as shown in Fig. 3, in order to cause the desired effect upon the selenium cell 5 is provided with the transparent light ray unobstructing portion S which may be in the nature of a slot formed in the film longitudinally thereof or may be formed by shaving from the surface of the film the sensitized gelatin so that such portion of the film when disposed between the cone of the lamp house L will permit of the projection through the lens tube 1 of the intense or full effect of the rays of light from the lamp, the same being reflected by the mirror 4 upon the selenium cell 5, whose resistance is reduced thereby to permit the current from the battery 8 to flow there-through and thus energize the relay 10. This action as before stated, attracts the armature 13 and causes the circuit to control the clutch throwing electromagnets 20—26' and 20'—26 as elected.

It is essential to the operation of the present device, that the rays of light to affect the selenium cell, be unobstructed, for even apparently clear portions of the sensitized gelatin carried by the film will interfere and prevent such rays from properly affecting the cell. Therefore either a slot is cut longitudinally through the body of the film, or the sensitized gelatin is removed to produce a space that will be clear and not obstruct the rays of light.

As seen in Fig. 4, the lens tube 1^a having the lens L' therein, is so constructed that the selenium cell 5' is disposed to constitute a support or ring for the lens, said selenium cell 5' being constructed in one or more sections as may be found expedient. In this case, the conductor wires 11 and 11^a are connected to the selenium cell, as illustrated in diagram in Fig. 1.

It is apparent from the foregoing description, that the present device may be readily applied to any of the projector machines now in use, with merely the necessity of at-

taching the arm 3 and bracket 6 to the lens tube, or said bracket and arm may be carried by a single clamp to be attached to the lens tube, thus without interfering with any mechanism in the aperture door or in the portion adjacent the film as is customary where the film carries a switch closing means.

What is claimed is:—

1. The combination with a lamp house, having a lamp, a motion picture projector machine having a lens tube and a sound reproducing machine for operation in synchronism with the projector machine, of a film provided with a light ray unobstructing portion, and means set in motion by the light rays projected through the unobstructing portion of the film to control the communication of motion from one machine to the other.

2. The combination with a lamp house, having a lamp, a motion picture projector machine having a lens tube and a sound reproducing machine for operation in synchronism with the projector machine, of a film provided with a light ray unobstructing portion, and means set in motion by the light rays projected through the unobstructing portion of the film to control the communication of motion from one machine to the other, said latter means including a selenium cell controlled electrical circuit.

3. The combination with a lamp house having a lamp, a motion picture projector machine having a lens tube, a film provided with a light ray unobstructing portion, and a sound reproducing machine for operation in synchronism with the projector machine, of an electrical means for setting in motion the sound reproducing machine when the unobstructing portion of the film is interposed between the lamp and the lens tube, said latter means including a primary circuit having a selenium cell, said cell being disposed to be affected by the rays of light from the lens.

4. The combination with a lamp house having a lamp, a motion picture projector machine having a lens tube, a film provided with a light ray unobstructing portion, and a sound reproducing machine for operation in synchronism with the projector machine, of an electrical means for setting in motion the sound reproducing machine when the unobstructing portion of the film is interposed between the lamp and the lens tube, said latter means including a primary circuit, having a source of electrical energy, a relay, and a selenium cell in said circuit, said selenium cell being disposed to be affected by the rays of light from the lens.

5. The combination with a lamp house having a lamp, a motion picture projector machine having a lens tube, a film provided with a light ray unobstructing portion, and

a sound reproducing machine for operation in synchronism with the projector machine, of an electrical means for setting in motion the sound reproducing machine when the unobstructing portion is interposed between the lamp and the lens tube, said latter means including a primary circuit having a source of electrical energy, a relay, a selenium cell being disposed to be affected by the rays of light from the lens, and a mirror disposed in the rays of light to reflect the rays of light from the lens upon the selenium cell.

6. The combination with a motion picture projector machine, a film provided with a light ray unobstructing portion and a sound reproducing machine connected for synchronous operation, of electrical means for connecting one to the other and including a selenium cell controlled circuit to be affected by the projected rays from the motion picture machine after passage through the light ray unobstructing portion of the film.

7. The combination with a motion picture projector machine having a lens tube, a film provided with a light ray unobstructing portion, and a sound reproducing machine, both of said machines being connected for synchronous operation, of electrical means for connecting one machine to the other, and including a primary circuit including a source of electrical energy, an electro-magnet, and a selenium cell, said cell being disposed to receive the rays of light from the lens and after passage through the unobstructed portion of the film.

8. The combination with a motion picture projector machine having a lens tube, a film provided with light ray unobstructing portion, and a sound reproducing machine, both of said machines being connected for synchronous operation, of electrical means for connecting one machine to the other, and including a primary circuit including a source of electrical energy, an electro-magnet, a selenium cell, said cell being disposed to receive the rays of light from the lens, and a reflecting mirror attached to the lens tube and disposed to reflect the rays of light projected through the light ray unobstructing portion of the film and the lens upon the selenium cell.

9. The combination with a motion picture projector machine having a lens tube, a film having a light ray unobstructing portion, and a sound reproducing machine connected to the motion picture machine for synchronous operation, of electrical means for controlling the operation of one of the machines relatively to the other, and including a primary electrical circuit including a source of electrical energy and an electro-magnet, and a selenium cell in said circuit and disposed to be affected by the rays of light after passage through the unobstructing portion of the film, and a see-

ondary electrical circuit including a source of electrical energy, an electro-magnet, and a switch, the switch being controlled by the electro-magnet of the primary circuit.

10 The combination with a motion picture projector machine having a lens tube, a film having a light ray unobstructing portion, and a sound reproducing machine connected to the motion picture machine for
15 synchronous operation, of electrical means for controlling the operation of one of the machines relatively to the other, and including an electrical circuit including a source of electrical energy and an electro-magnet, a selenium cell in said circuit and disposed to be affected by the rays of light
20 after passage through the unobstructing portion of the film, and a mirror attached to direct the rays of light from the lens tube against the selenium cell.

11. The combination with a motion picture machine having a lens tube, a film having a light ray unobstructing portion, and an electrical clutch throwing means, of electrical means for operating the electrical clutch throwing means, including a relay circuit having a source of electrical energy

and an electro-magnet, and a selenium cell in said circuit for disposition in the path to be affected by the rays of light from the lens tube when projected through the unobstructed portion of the film. 5.

12. The combination with a motion picture machine having a lens tube, a film having a light ray unobstructing portion, and an electrical clutch throwing means, of electrical means for operating the electrical clutch throwing means, including a relay circuit having a source of electrical energy and an electro-magnet, a selenium cell in said circuit for disposition in the path to be affected by the rays of light from the lens tube when projected through the unobstructed portion of the film, and a mirror attached to the lens tube for reflecting the rays therefrom upon the selenium cell. 40 45

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHAS. W. EBELING.

Witnesses:

EDWARD C. REEB,
SAMUEL RAUTENBERG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MODULATOR FOR SOUND PRODUCING MACHINES.

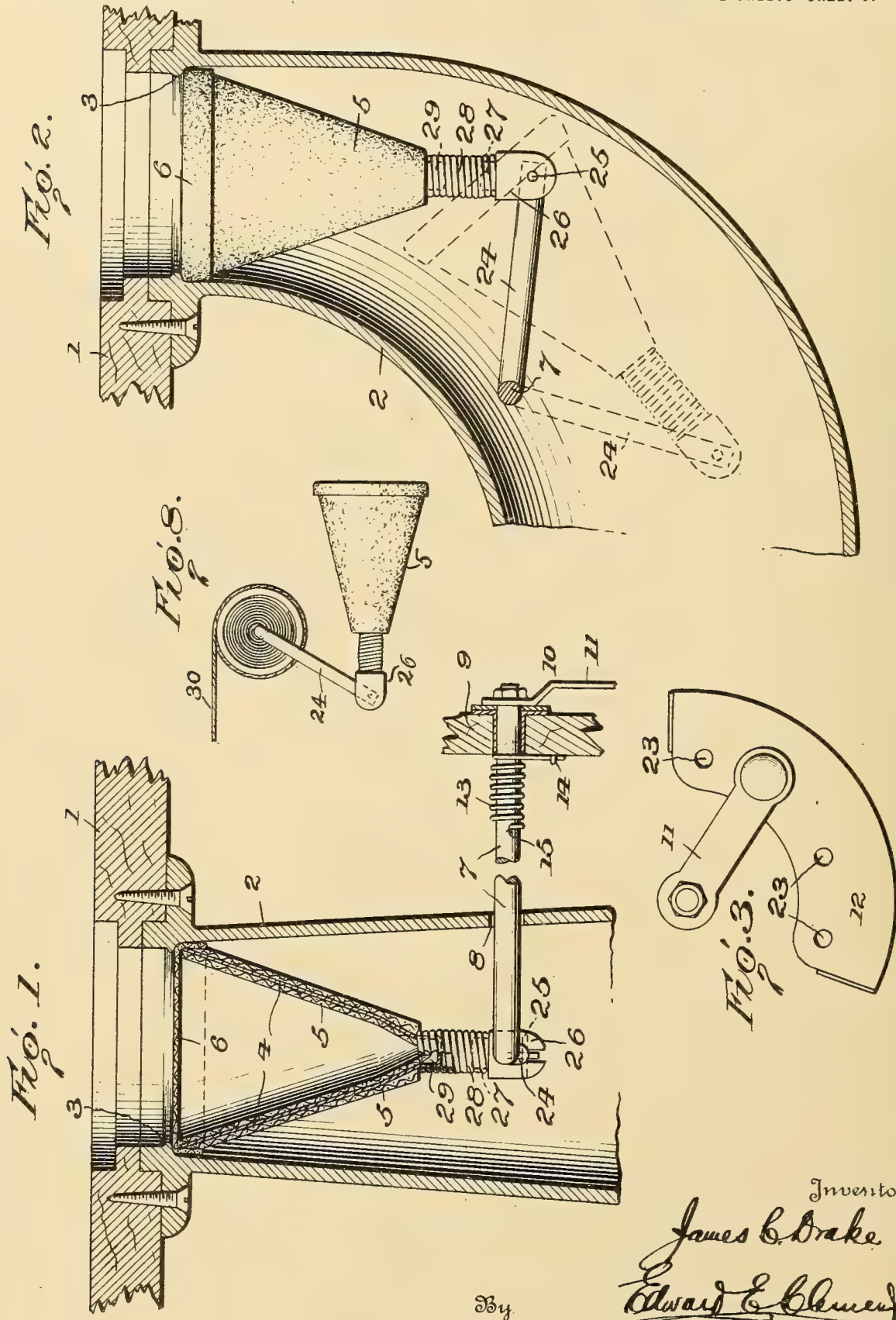
1,254,665 ----- J. C. Drake,
Patented Jan. 29, 1918,
Filed June 6, 1916.

J. C. DRAKE.
MODULATOR FOR SOUND PRODUCING MACHINES.
APPLICATION FILED JUNE 6, 1916.

1,254,665.

Patented Jan. 29, 1918.

2 SHEETS—SHEET 1.



Inventor

James C. Drake

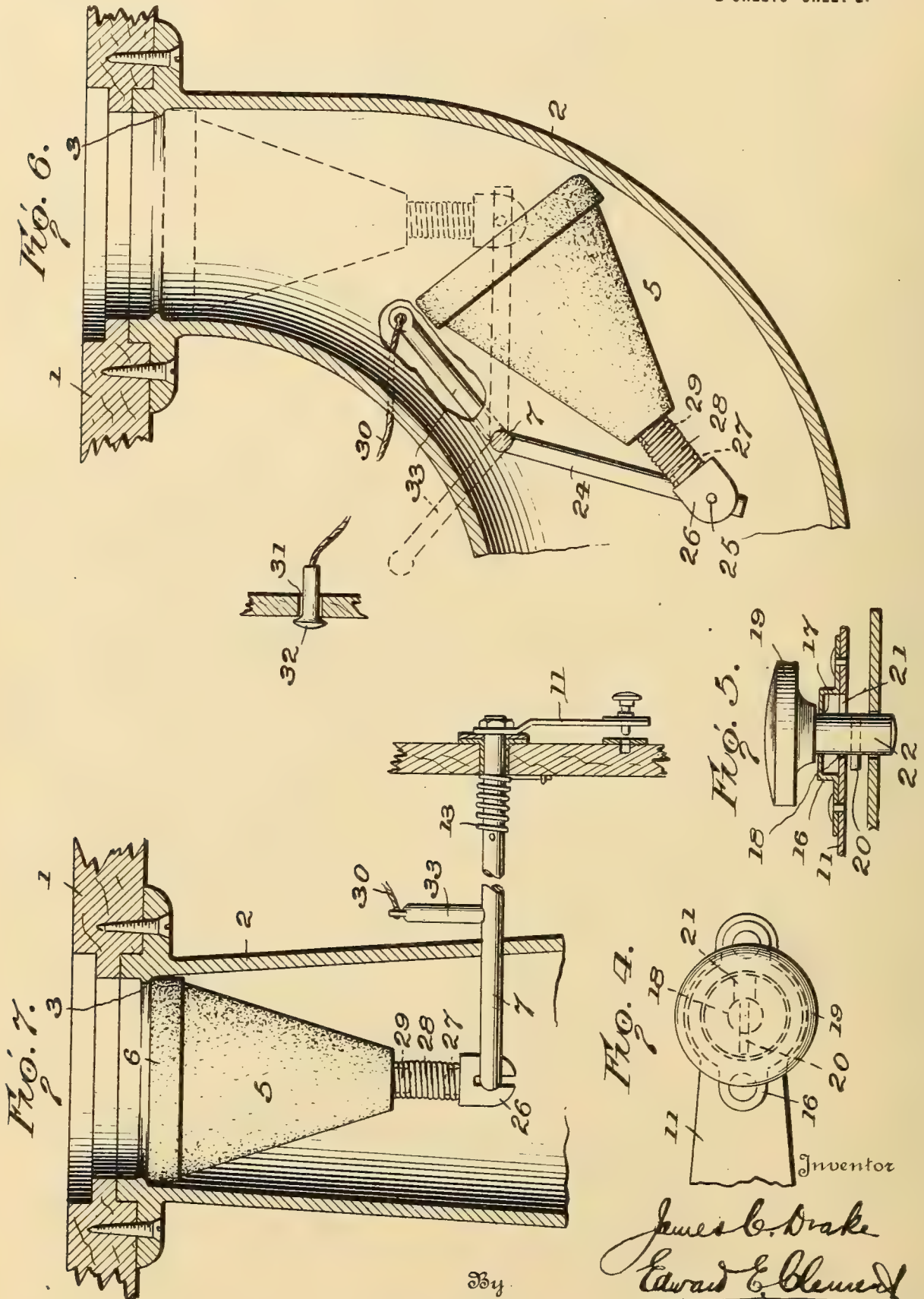
Edward E. Clement

Attorney

J. C. DRAKE.
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 APPLICATION FILED JUNE 6, 1916.

1,254,665.

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 2 SHEETS—SHEET 2.



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James C. Drake
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UNITED STATES PATENT OFFICE.

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MODULATOR FOR SOUND-PRODUCING MACHINES.

1,254,665.

Specification of Letters Patent.

Patented Jan. 29, 1918.

Application filed June 6, 1916. Serial No. 101,909.

To all whom it may concern:

Be it known that I, JAMES C. DRAKE, a citizen of the United States, residing at Rochester, in the county of Olmstead, State of Minnesota, have invented certain new and useful Improvements in Modulators for Sound-Producing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to means for regulating the volume of sound transmitted through a conveyer or horn such for example as those employed in connection with talking machines, and has for its object the provision of means whereby the volume of sound may be varied from the full capacity of the conveyer or horn, down to a very low and soft tone, without reflection, interference, false vibrations, or any alteration or deterioration in the timbre or quality of the tone.

Ancillary objects of the invention are, to enable the device to be easily and conveniently controlled by an operator, to provide convenient and efficient means for locking the device in different positions, and to reduce the entire structure to a simple but highly efficient mechanical combination easily installed, but not easily deranged.

I attain my principal object by providing an inverted padded cone after the fashion of a mute movable with respect to a seat formed in the sound conveyer or horn so that in one position the cone will close the sound conveying channel, in its extreme opposite position will widely open the same, and in its intermediate positions will progressively decrease the area of said channel from the open or maximum position to the minimum or closed position.

I attain my ancillary objects by mounting the cone modulator on one end of a rocking lever whose transverse shaft extends out through an opening in the side of the horn and has its end fitted with means such as a crank handle, whereby it may be turned into various positions, corresponding to the several positions which the modulator is desired to assume; by providing an arc plate in connection with the crank handle with means for locking the same thereto; and by mounting the modulator by means of a flexible joint directly upon the end of the rocking lever in the horn, securing said lever

directly upon the transverse control shaft, and by extending said shaft directly to a point within reach of the operator. Incidentally I preferably provide the shaft with means such as a spring for the purpose of normally maintaining the modulator in one extreme position or the other.

It should be understood in reading the following detailed description, first that the invention is applicable to various sound producing devices, including phonographs, loud talking telephones, some types of megaphones, automatic and other musical instruments, etc., and furthermore, the description and illustration of species hereinafter, are given for purposes of definition and not of limitation. It is to be understood that subordinate details and non-essential features may be altered and modified without departing from the spirit of my invention.

My invention is illustrated in the accompanying drawings, in which:

Figure 1 is a vertical sectional view showing my modulator and its operating parts applied to the horn of a phonograph.

Fig. 2 is a vertical section view taken at right angles to Fig. 1.

Fig. 3 is a face view of the locking means for the operating shaft.

Figs. 4 and 5 are respectively a plan view and a transverse section, both on an enlarged scale, of the knob on the crank arm and its locking means.

Fig. 6 is a view similar to Fig. 2 showing the modulator worked by a bell crank by means of a cord or cable operated from a distance.

Fig. 7 is a view similar to Fig. 6 but taken in a plane at right angles to the plane of Fig. 6.

Fig. 8 is a view similar to Fig. 6 showing a spring drum substituted for the upper end of the bell crank lever 33.

Referring to the drawings, 1 designates the motor board or supporting partition of a phonograph, from which depends the sound conveyer or horn 2. For the sake of convenience, part 2 will be designated hereinafter, both in the specification and claims, as a horn, but it must be understood that this term comprehends any form of conveyer without limitation.

The horn 2 is provided with an annular seat 3, somewhat similar to an ordinary off-

set valve seat. From this seat the horn drops and then bends forwardly as clearly shown in Fig. 2, terminating in an expanded or flared end, or such other form of opening as may be desired. In the ordinary talking machine or phonograph, with a concealed or cabined horn of the type shown, the latter would be of cast iron from the motor part down to the bend, and usually of wood or the equivalent with a constant ratio of enlargement or flare, to the opening in the side of the cabinet. For simplicity I have avoided showing details of the horn in the drawings, and in any case, my modulator, as a matter of convenience and expediency would be located as shown in the upper or metal part of the horn or conveyer.

The modulator itself is composed essentially of a thin metal hollow cone 4, heavily padded inside and out with material 5 such as felt adapted to absorb sound waves and thereby protect the cone and prevent forced vibrations of the metal therein. As a further means of absorbing sound waves, I provide a felt cap 6, which is stretched over and permanently fixed to the large end of the cone 4. In order to work this modulator, I provide a rock-shaft 7, journaled transversely at 5 in one side of the horn 2, and at 9 in an opening through the wall of the cabinet 10, which is shown only in fragmentary form in Figs. 1 and 6. At its outer end the shaft carries a crank arm 11 (see Figs. 1, 2 and 3) which, as the shaft is rocked, describes an arc over the plate 12. The shaft is preferably provided with means such as a coil spring 13 one end of which at 14 is fastened to the side of the cabinet, and the other end at 15 attached to the shaft, to exert a constant torque thereon, in the direction of its closing movement. In order to maintain the shaft however, in any position to which it may be set, the crank arm 11 is provided with locking means best shown in Figs. 3, 4 and 5. Upon the end of the arm 11 is provided a raised plate 16, having an opening 17 registering with a similar opening 18 in the arm. Through these openings passes the stem 22 of a button or knob 19, provided with a radial stud 20 which locks the stem on the knob either in depressed or elevated position and for that purpose may be raised and lowered through a notch 21 to one side of the stud-opening 18 in the arm. Beneath the arm, and in the arc of travel of the stem 22 of the knob, are openings 23, in the arc plate 12. By turning the knob so as to bring the stud 20 above the notch 21 and then turning the crank arm until the stem 22 registers with any desired one of these openings 23, the knob may be pressed down until its end projects through the openings 23 as shown in Fig. 5, and by then giving it a partial turn

the stud 20 will pass beneath the solid portion of the arm 11 and lock the parts against displacement.

Motion is communicated from the shaft 7 to the cone 4 by means of a rock lever 24, which is best shown in Fig. 2, although it may be seen foreshortened in Fig. 1. The end of this lever 24 has a pivotal connection 25 with a socket piece 26 carrying a projecting stud 27, upon which is secured a short, flexible shaft or connector 28, the upper end of which takes around a projecting stud 29 on the small end of the cone. The flexible shaft or connector 28 may be an ordinary tightly wound and stiff helical spring, soldered at its upper and lower ends to the two studs 29 and 27 respectively.

In Fig. 6 I have shown a modified form of mechanical motion for the modulator, the lever 24 in this case being a bell-crank lever, secured on the shaft 7, and having a cord or cable 30 secured to its upper end and extending out through an opening 31, in the side of the cabinet 10.

The shaft 7, being provided with a helical spring to turn it constantly into open position, it is obvious that the modulator may be more or less closed by merely pulling upon the cord 30. I preferably provide the cord with a terminal knob or handle 32, which when the cord is retracted within the cabinet and not in use, will close the orifice 31 which may be provided with any desired form of spring-clip or retaining means for holding the knob in position. The interior of the cabinet may also be fitted with a spring drum or other means for winding up the cord when not in use. In fact, such a spring drum may replace the upper arm 33 of the bell crank lever, being mounted on the shaft 7 to one end of which the spring should be secured, (the other end being secured to the outside of the drum), so that when the cord is pulled out it will turn the drum without affecting the modulator, but when the drum has turned to a predetermined limit stop, on the shaft 7, it will then resist further unwinding, and a continued pull will turn the shaft 7 and move the modulator. Conversely, when the pull on the cord is relaxed, the modulator will first assume its normal position, shown in full lines in Fig. 6, and then the drum will start to rewind the cord. In this arrangement, the spring on the drum must be of less strength than the spring on the modulator shaft, for obvious reasons.

Even though the cord or cable of Fig. 6 be employed the locking device or direct manual control of Figs. 1, 2 and 3 may also be retained. This is indicated in Fig. 7 in which the manual control and locking parts are the same as in Figs. 1 to 5, but with the direction of the spring 13 reversed. In other words, in Figs. 6 and 7 the spring 13

tends to hold the modulator normally open, while in Figs. 1 to 3 the spring tends to hold the modulator normally closed. This is because the direct locking control in Figs. 1, 2 and 3 makes the direction of spring movement immaterial while in Figs. 6 and 7, since the operator could not be expected to always sit holding the cord, the machine must normally be in open position.

With this description of the apparatus, it is thought the operation and principles involved will require only brief mention. Those experienced in this art know that the devices heretofore employed and proposed for regulating the sound in talking machines reflect more or less of the sound waves back to the sound box, thus causing a buzz which is more or less apparent according to the density of the reflecting surface. If the interposed valve or muting member is too porous, the volume of sound will never be reduced to a desired minimum. In the present case with my invention, there is no reflection, and the sound at all times and in all stages of reduction, goes down into a very soft rich tone. The intensity or amplitude of the vibrations entering the neck of the horn 2 is lessened by their passage through the felt cap 6 of the modulator, inside of which they come in contact with the inwardly tapering padded walls of the cone 4. By reason of the taper there is no surface operating to reflect the sound waves directly back to the sound box, and with respect to such sound waves as are ultimately reflected out of the cone, the energy of their vibrations has then become so attenuated by conversion into heat through friction and viscosity that they become practically lost in the upper sound conveyer or tone arm and never reach the sound box.

When the modulator is seated firmly in the neck of the horn as shown in full lines in Figs. 1 and 2, the volume of transmitted sound is reduced to a minimum, and as the shaft 7 is turned, the lever 24 turns down the cone 4 gradually, and the sound gradually increases until the parts finally reach the position shown in Fig. 2, when all the sound waves entering the horn are permitted to pass on and be reflected therein, thus obtaining the maximum volume according to the design of the horn. For practical purposes, the positions of the modulator and its controlling parts may be limited to three, indicated on the arc plate of Fig. 3 by the legends "soft", "medium" and "loud"; but of course the number of these may be increased *ad libitum*.

The function of the flexible joint 28 is

dual; in the first place it permits a long swing of the lever 24, so as to bring its pivotal end 25 into the axial line of the upper opening 6 of the horn, which would otherwise be impossible on account of the shape and proportions of the modulator; and second, it compensates for any cumulative errors that may occur in manufacturing, so that the cone of the modulator when assembled with the horn, will always be permitted to assume a central location.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In a sound producing device, a passageway having a sound receiving opening, and a modulator fitted to said opening comprising the following instrumentalities: a hollow conical body with its large end fitted to the opening and its small end pointed in the direction of transmission of the sound, and means extending through the side of the passageway for moving said body to and from the opening.

2. In apparatus of the class described, a sound opening, a conduit extending from said opening, and a modulator fitted to said conduit comprising the following instrumentalities; a transverse rock shaft extending through a wall of the conduit, a lever on said rock shaft, a non-resonant body tapering from one end to the other, with its larger end adapted in one position to close and in other positions to partially or completely open the conduit or passageway, a resilient connection between the small end of said body and the end of the rock shaft arranged to positively transmit motion therebetween in both operative movements, and means outside the conduit to move said shaft.

3. In apparatus of the class described, a sound opening, a conduit extending from said opening, and a modulator fitted to said conduit comprising the following instrumentalities; a transverse rock shaft extending through a wall of the conduit, a lever on said rock shaft, a non-resonant body tapering from one end to the other, with its larger end adapted in one position to close and in the other positions to partially or completely open the conduit or passageway, a pivoted abutment on the inner end of said rock shaft, and a coiled spring flexible connection between said abutment and the small end of said body, with means outside the conduit to rock said shaft.

In testimony whereof I affix my signature.

JAMES C. DRAKE.

METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING
SOUNDS TO ACCOMPANY MOTION PICTURES.

1,254,684 ----- R. L. Greenfielder.

Patented Jan. 30, 1916.

Filed Mar. 30, 1916.

E. L. GREENSFELDER.
METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING SOUNDS TO ACCOMPANY MOTION PICTURES.

1,254,684.

APPLICATION FILED MAR. 30, 1916.

Patented Jan. 29, 1918.

4 SHEETS—SHEET 1.

Fig. 1.

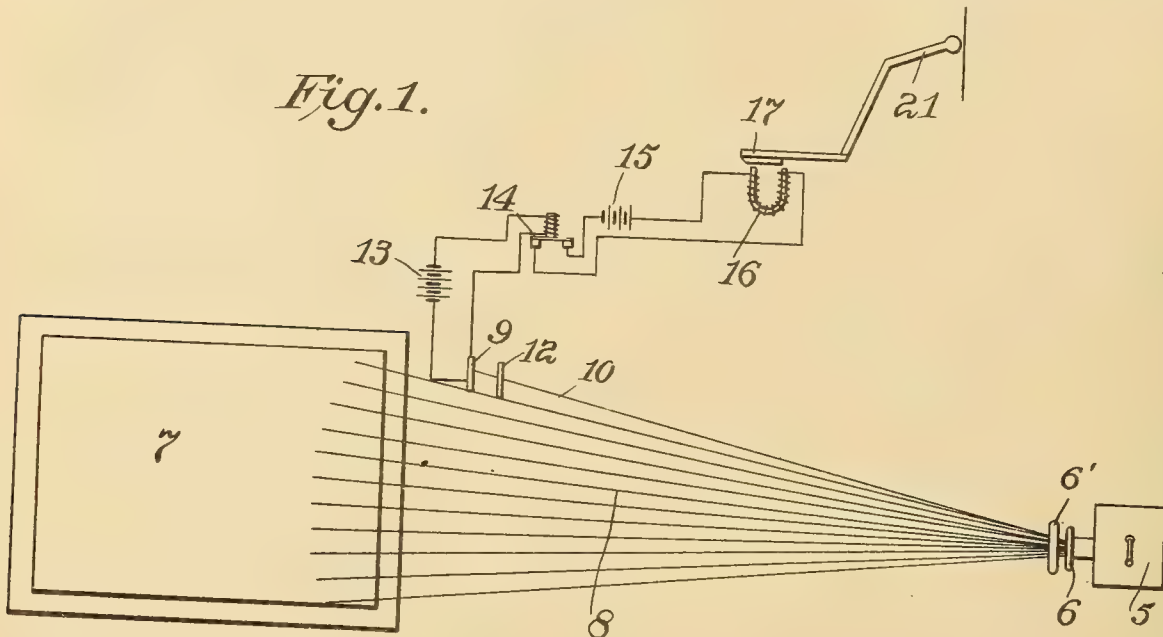


Fig. 2.

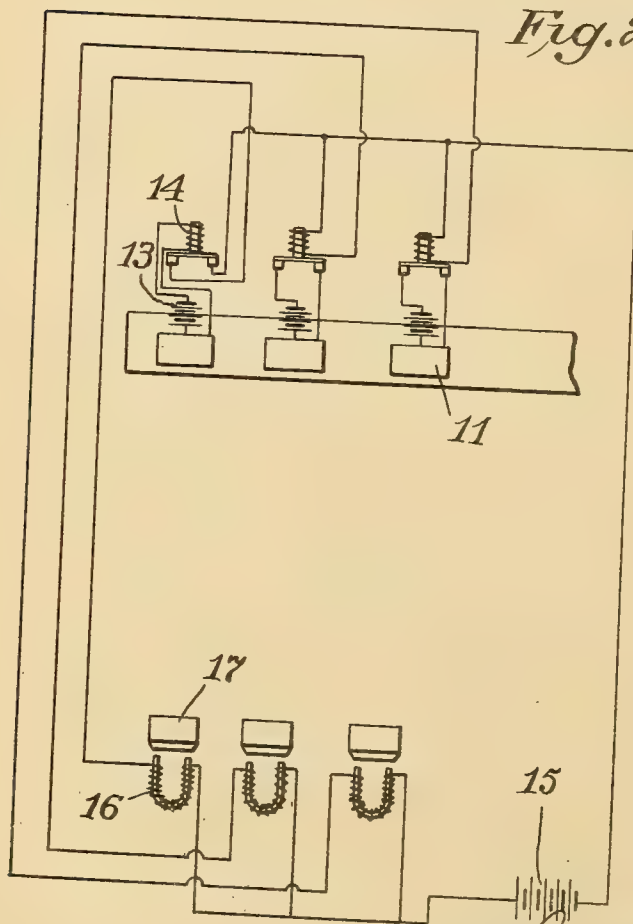
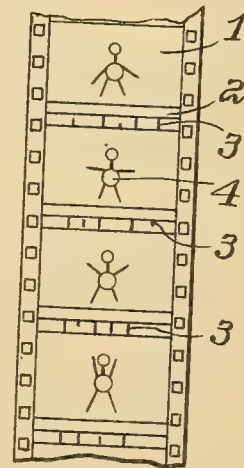


Fig. 3.



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METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING SOUNDS TO ACCOMPANY MOTION PICTURES.

APPLICATION FILED MAR. 30, 1916.

1,254,684.

Patented Jan. 29, 1918.

4 SHEETS—SHEET 2.

Fig. 4.

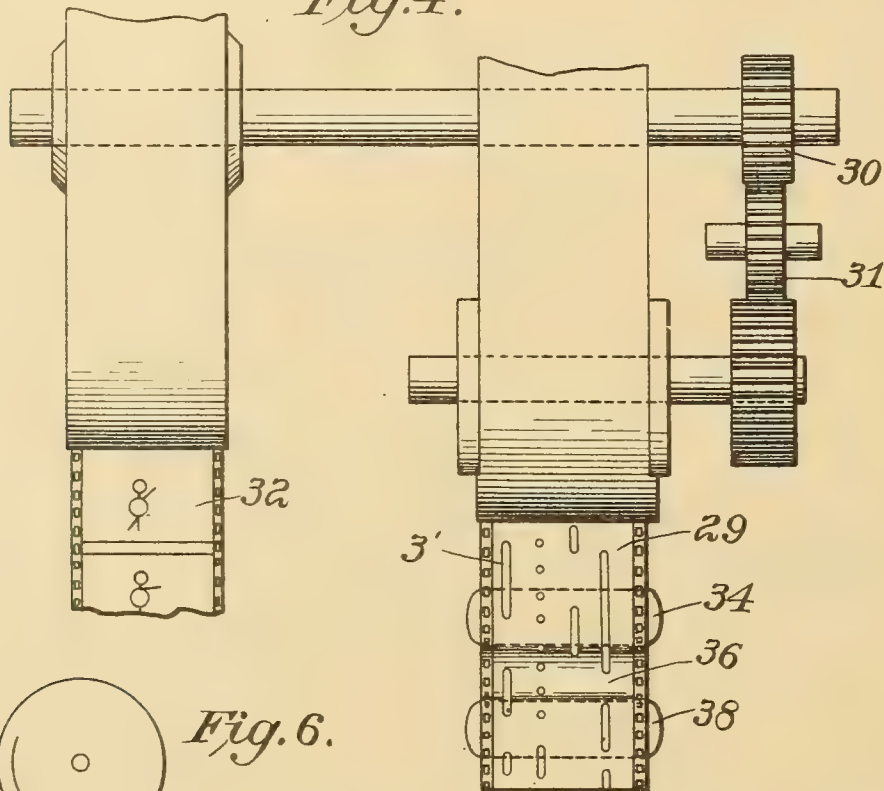


Fig. 6.

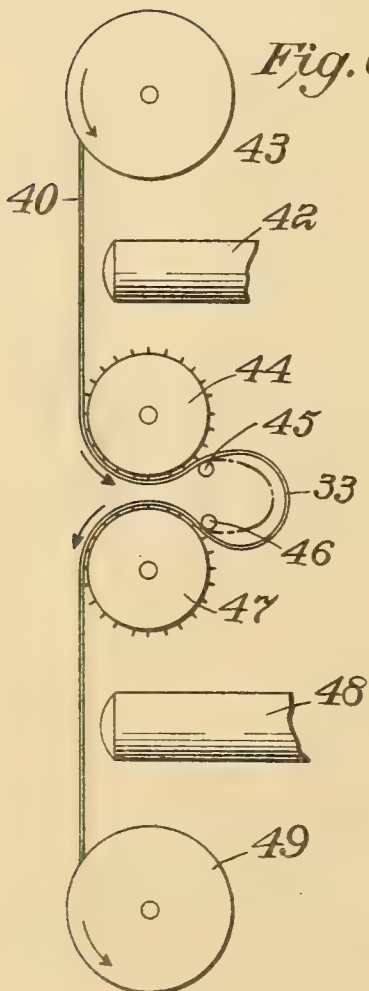
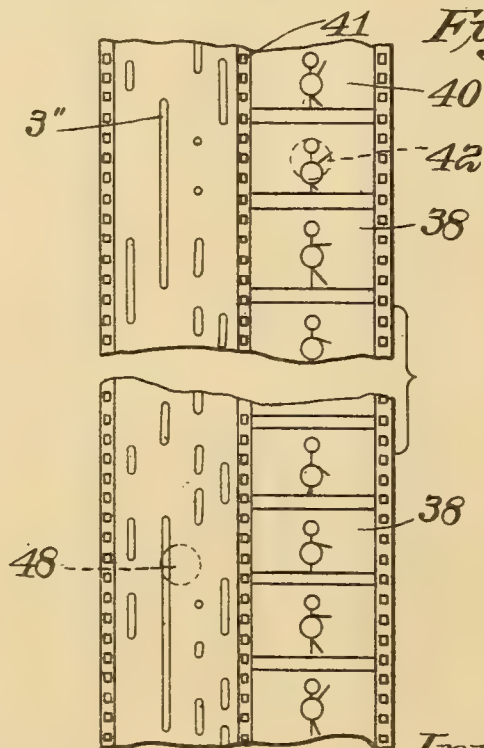


Fig. 5.



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METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING SOUNDS TO ACCOMPANY MOTION PICTURES.

APPLICATION FILED MAR. 30, 1916.

1,254,684.

Patented Jan. 29, 1918.

4 SHEETS—SHEET 3.

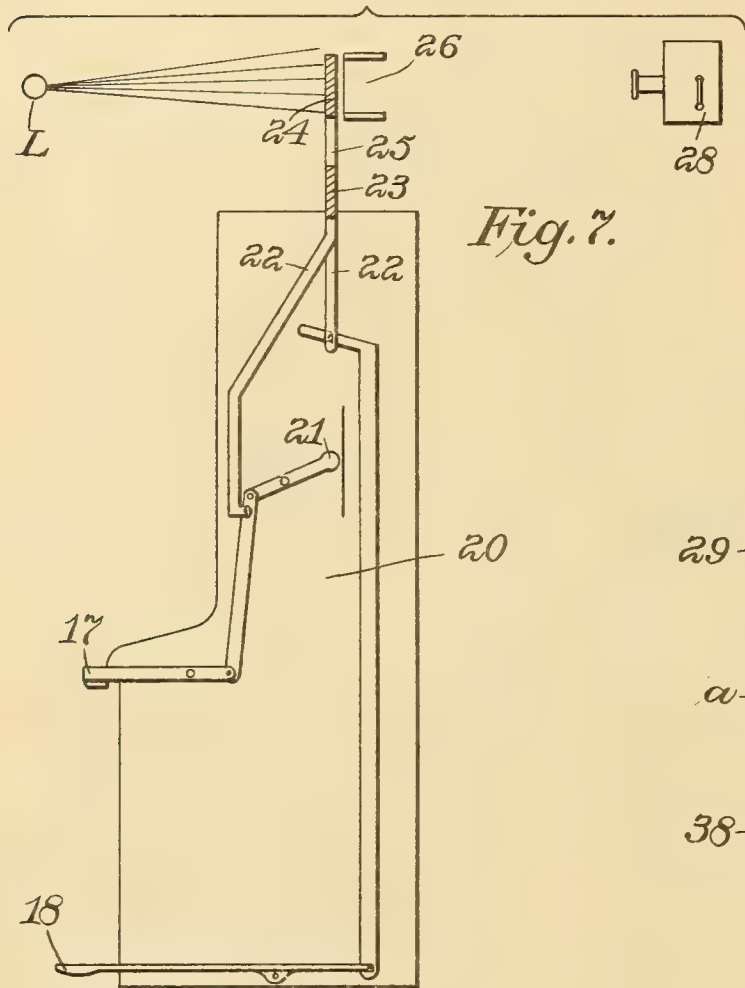


Fig. 7.

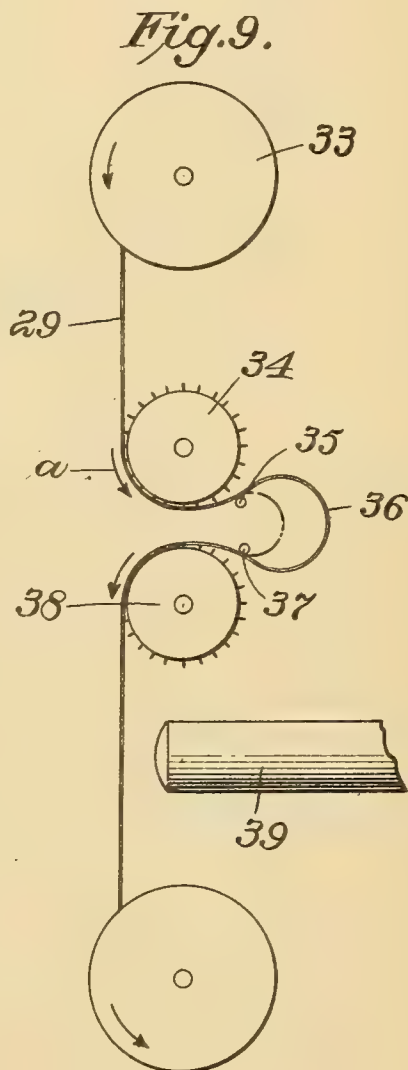


Fig. 9.

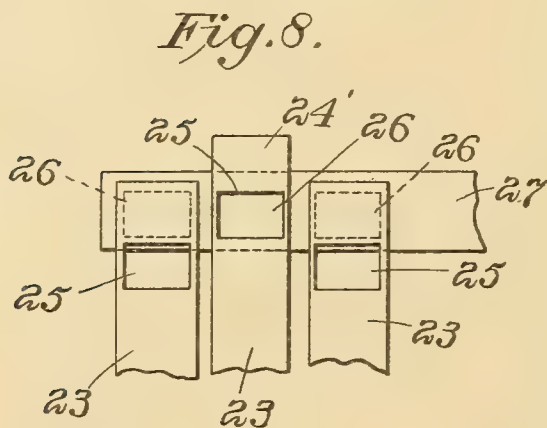


Fig. 8.

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METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING SOUNDS TO ACCOMPANY MOTION PICTURES.

APPLICATION FILED MAR. 30, 1916.

1,254,684.

Patented Jan. 29, 1918.

4 SHEETS—SHEET 4.

Fig. 11.

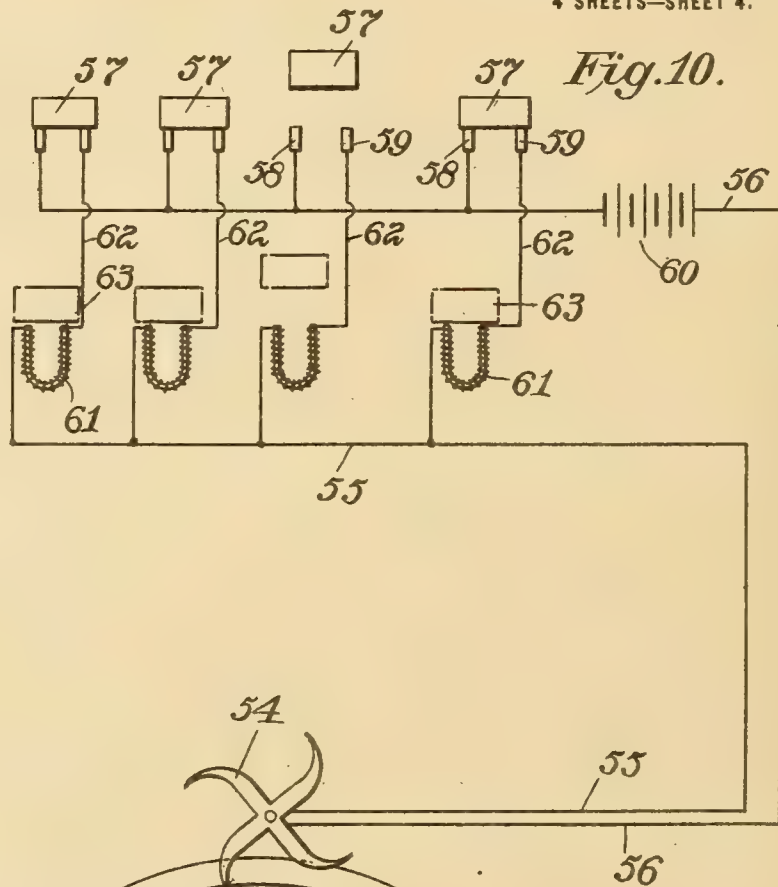
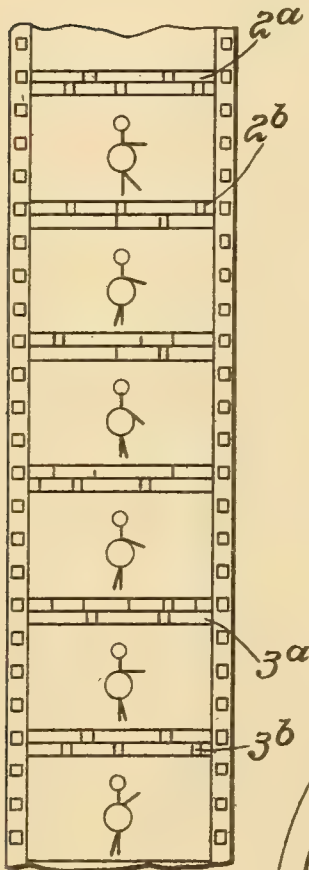
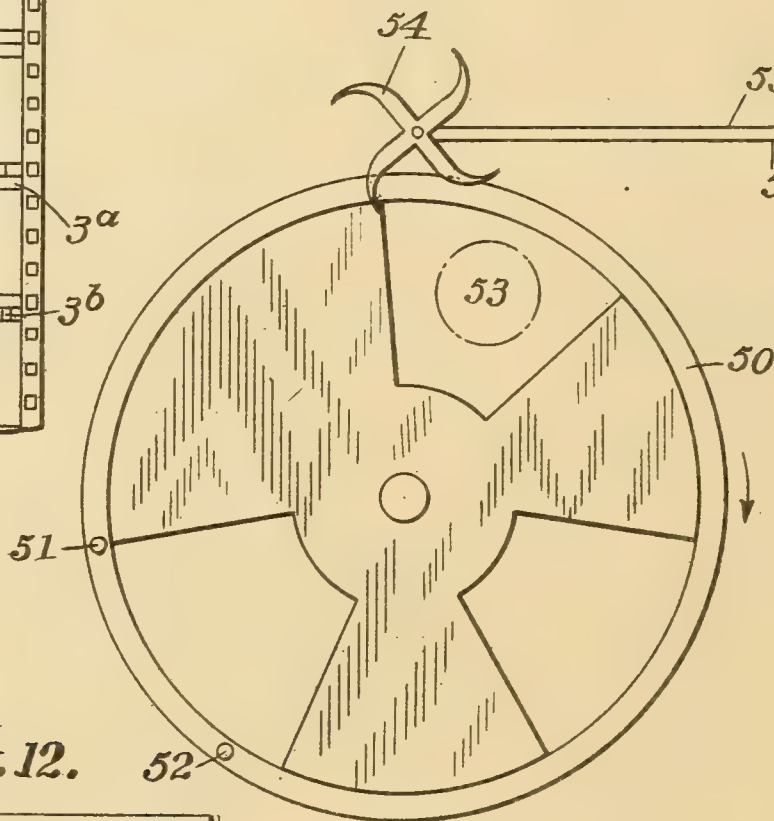
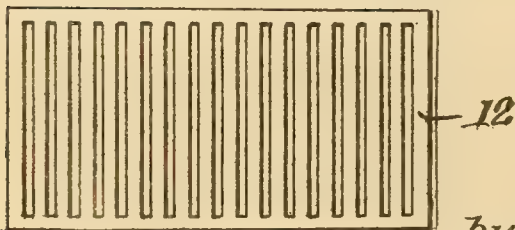


Fig. 12.



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UNITED STATES PATENT OFFICE.

ELMER LEWIS GREENSFELDER, OF BALTIMORE, MARYLAND.

METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING SOUNDS TO ACCOMPANY
MOTION-PICTURES.

1,254,684.

Specification of Letters Patent.

Patented Jan. 29, 1918.

Application filed March 30, 1916. Serial No. 87,788.

To all whom it may concern:

Be it known that I, ELMER L. GREENSFELDER, a citizen of the United States, and residing at Baltimore, Maryland, have invented certain new and useful Improvements in Methods and Apparatus for Synchronously Producing Sounds to Accompany Motion-Pictures, of which the following is a specification.

The present invention relates to an improved method of producing different sounds during the projection of motion pictures upon the object screen. As is customary at present, while the pictures are being shown upon the screen, the orchestra plays appropriate musical selections. In order to produce a more realistic effect the music is generally chosen and conducted so as to give added expression to the actions and descriptive scenes being reproduced in pantomime on the screen. Unusual sounds, such as the report of a gun, the shriek of a whistle, the clatter of horses' feet, the cry of a child, the ringing of a bell, etc., all of which add greatly to the vividness of the scene, are generally assigned to one of the men in the orchestra to be reproduced as nearly in synchronism with the corresponding action in the picture as possible.

The object of the present invention is to provide an improved method whereby these various supplemental sounds, or even the piano accompaniment will be produced by the various instruments in exact synchronism with the reproduction on the picture screen of the scene of which they are illustrative.

The invention consists in providing a system of control for these several instruments which will be automatically operated by the picture film itself. It consists, more specifically, in photographing on the film a series of lines, or marks, disposed parallel to the length of the film, and suitably positioned in relation to the individual pictures of the scene being reproduced, to accompany the action or description which it is desired to have emphasized by the corresponding sound. These lines or marks are made transparent, white, or translucent on a darkened background. The lines may each represent one note of a piano (in the case of a piano record), while others may represent an expression lever, a sustaining pedal, or the operating mechanisms, or instrumentalities for beating a drum, ringing a bell, blow-

ing a whistle, or producing like noises. The light from the motion picture machine passes through these transparent "sound marks" as the film is being shown on the screen. These light rays are intercepted between the lens of the machine and the screen, or at the screen, and caused to fall upon a series of exposed, separate, selenium cells. An individual selenium cell is provided for each "sound mark" of the film and each ray of light is directed by a system of slots and guides to exactly register with its corresponding cell. These cells are in turn each connected with a separate relay, electric battery and electro-magnet, the latter being so placed as to mechanically operate the sound instrumentality upon its becoming energized.

The invention further contemplates the provision of a method by which the musical instruments may be controlled and instrumental selections rendered separately and independently of the pictures, as for example, during the intermission of performances, or at any desired time or place.

The invention includes among other objects suitable arrangements and connections, whereby the sound producing instruments may be located near the screen or at a point sufficiently remote from the motion picture machine to produce the desired effects upon the audience.

The invention, while embodying in all of its forms the main principles of operation above set forth, may be varied somewhat to adapt itself to different kinds of machines. For example as previously pointed out, the "sound marks" may be placed on the picture film and be operated by the intermittent feed of the machine. Besides this method the "sound marks" might be formed on a separate reel of film adapted to have a continuous motion and geared to the sprocket turning the picture reel. Again a continuous method of projecting the "sound marks" may be employed in which a widened reel is used, on one side of which are the "sound marks", while the pictures occupy the remaining space.

With these and other objects in view the invention consists in the combination and arrangement of parts more fully described in the following specification, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings the various methods by which the invention may be put into practice are illustrated diagrammatically by a series of views suggesting the arrangement and use of the several forms of apparatus employed.

In the drawings:—

Figure 1 is a diagrammatic view illustrating one embodiment of the present invention.

Fig. 2 is a diagram showing the electrical connections for the same more in detail.

Fig. 3 is a portion of a film of usual type having one arrangement of "sound marks" photographed thereon.

Fig. 4 illustrates diagrammatically a modified arrangement involving the use of two separate films driven synchronously.

Fig. 5 is a diagrammatic plan view illustrating a further modified arrangement involving the use of a double width film.

Fig. 6 illustrates the arrangement of Fig. 5, shown in side elevation.

Figs. 7 and 8 illustrate diagrammatically in side and front elevational views respectively the apparatus used in recording the "sound marks" on a film.

Fig. 9 illustrates diagrammatically take-up mechanism used to move the film at a constant speed before the projecting apparatus.

Fig. 10 illustrates diagrammatically an arrangement for sustaining the connecting of the electric circuits until the next consecutive row of "sound marks" is before the projecting lens.

Fig. 11 is a modified form of film.

Fig. 12 illustrates the screen 12.

The invention will first be described in connection with the method illustrated by the diagrammatic views, Figs. 1, 2 and 3, in which a series of "sound marks" are recorded on a small section of the ordinary picture film. Fig. 3 shows a fragmental strip 1 of an ordinary motion picture film, having the usual transverse sections 2 on which there is no photograph or marking. In addition this view shows horizontal rows of "sound marks" 3, located immediately above the picture 4 and below the section or blank strip 2. It is obvious that the "sound marks" 3 could be located equally well below the picture rather than above. These "sound marks" consist of a series of translucent, transparent or white spaces, photographed on a darkened surface in the form of parallel lines extending in a direction parallel to the length of the film. The purpose of these "sound marks" is to permit rays of light from the lens of the projecting machine to pass through when the picture film is being projected upon a screen. The manner in which these lines or "sound marks" are photographed on the film will be described in detail in another part of

this specification. Fig. 1 illustrates diagrammatically the relative position and arrangement of all the instrumentalities employed in the use of an ordinary film carrying the "sound marks" 3 thereon at intervals between the pictures. The projecting motion picture machine 5, with its lens 6 and shutter 6' is suitably located so as to project the pictures on the object screen 7, 8 representing the cone of light rays passing from the lens to the screen. A shelf 9 is placed at a suitable point between the lens 6 and screen 7, or at the screen 7, so as to intercept the rays of light 10 coming from the film through the "sound marks" 3. The shelf 9 contains a plurality of selenium cells or plates 11 arranged in a horizontal row corresponding in number and arrangement to the "sound marks" 3 on the film. A slotted screen or grating 12 may be properly positioned in front of the shelf 9 for the purpose of reducing the magnified light rays coming from the "sound marks" and preventing overlapping of the rays on the selenium surfaces. Each particular "sound mark" 3 on the film has a corresponding selenium cell 11 on the shelf 9, upon which it is adapted to impinge a ray of light as it passes between the light source and the lens of the projecting machine. When, for example, it is desired to apply the invention for the purpose of operating a player piano, eighty-eight "sound marks" 3 are provided, one for each note of the piano and additional "sound marks" for expression levers. The number and arrangement of these "sound marks" can be varied at will according to the number and variety of sound instruments it is desired to operate.

As previously pointed out, the rays of light 10 being dispersed and directed through the "sound marks" 3 and then reduced by the slits of the grating 12, are directed upon the corresponding selenium cells 11. These latter are each connected with a battery 13 in series with a corresponding relay 14, which in turn are connected through a second battery 15, each to a corresponding electro-magnet 16 adapted to operate a control lever 17 of a piano key, expression pedal, drum stick or other sound producing instrument. It is well known that selenium, when exposed to a concentrated ray of light, changes its conductivity with a resultant lowering of its electrical resistivity. This electro-physical change is relied on for the purpose of closing the electric circuit, including battery 15 and the energization of the corresponding electro-magnet.

The exact system of electrical connections may be varied by providing, for instance, a single battery instead of the individual ones 13 to operate any of the selenium cells 11 on which the light might fall, or again battery 15 could be replaced by a number of small

batteries, one for each relay. Again either battery 15 or batteries 13 could be replaced by a source of current, such as the house current, connected through a transformer.

5 The position of the shelf 9, containing the selenium cells 11, can be placed at any arbitrary point in the path of the light rays coming through the "sound marks" 3, either at or near the screen 7, or at a point about mid-
10 way between the screen and the lens (as shown in Fig. 1), or near the operator's room. In order to effect the different locations of the shelf 9, a mirror may be placed in the path of the projected light rays so as to re-
15 flect them at any desired angle. A special lens may be placed near the projecting camera, through which the light rays are passed and dispersed so as to allow the shelf 9 to be placed within a comparatively short distance
20 of the projecting lens of the motion picture machine.

Instead of using a separate selenium cell for each "sound mark" as proposed, a single structure may be used with an exposed selenium surface which is divided lengthwise electrically into as many sections as there are
25 sounds and expressions to be operated by tapping off at regular intervals and connecting separately with the sources of current, relays, electro-magnets and corresponding sound instruments and expression levers to be operated. A shelf of thin partitions placed before the subdivided selenium surface would prevent the interference of the
30 light ray coming from a "sound mark" with any selenium surface subdivision except its corresponding one.

The method of photographing the "sound marks" 3, as used in the method illustrated
40 in Figs. 1 to 3, will next be described in detail and reference is made to Figs. 7 and 8 of the drawing. The rows of "sound marks" are photographed onto the picture film by a motion picture camera, the film of which is
45 moved intermittently as is done in photographing an ordinary motion picture scene. It is absolutely necessary that the film be moved, while the "sound marks" are being photographed, at exactly the same speed at
50 which the picture film, of which they are to control the accompanying sounds and music, is moved. By way of illustration, Figs. 7 and 8 show the manner of photographing the "sound marks" to record the notes of music
55 played upon a piano. Each key 17 or expression pedal 18 of a piano 20, or other instrument the sound of which is to be recorded, operates a hammer 21, or corresponding part of another instrument, and at the same
60 time moves a rod 22, which in this case is moved vertically. At the upper end of the rod 22 a plate 23 is carried, provided with blind or shutter part 24 and a corresponding opening 25 located immediately below the
65 same. The plate 23 is adapted to normally

remain in its lowered position with the shutter 24 intercepting the rays of light from any suitable source L and preventing them from registering with an aperture 26 formed in a horizontal shelf 27. A motion picture
70 camera 28 is suitably positioned behind the shelf 27 in line with the series of apertures 26. As the key or pedal of the piano operates the hammer 21, the rod 22 and plate 23
75 are moved so as to bring the opening 25 opposite the aperture 26 and allow the light from the source L to pass therethrough and be photographed by the motion picture camera 28. The film of the camera 28 must be
80 moved at the same speed for the purpose of photographing the "sound marks" 3, as when the camera is used for the purpose of photographing the corresponding scene to be re-
85 produced. While the "sound marks" 3 are being made by photographing the light intermittently passing through the aperture 26, the picture part of the film in camera 28 is
90 screened by a blind or shutter so as to remain unexposed. In this manner the "sound marks" 3 are photographed only on the narrow strip of the film shown in Fig. 3.

In order to secure the best results it has been found advisable to have a motion picture positive properly pieced and joined so as to be ready for projecting and exhibiting
95 before recording on the film in camera 28 the rows of "sound marks" that are to accompany the animated picture. This positive should contain on it blank spaces in the position of 3, Fig. 1. On the completed positive ready for the market these blank spaces
100 will be filled in by rows of sound marks, and the spaces for the pictures by the pictures, which can be effected by such a method as printing the positive from the two superimposed negatives, as will be hereinafter described. The pianist or musician, who is to play the accompaniment to be recorded for the picture, watches the positive picture as
105 it is projected on the screen before him from a motion picture apparatus at a definite speed. After he has become familiar with the picture, the positive is again projected through the motion picture apparatus and he then plays the accompaniment to the picture, introducing whatever melodies, chords,
110 compositions or sound effects he thinks appropriate to the action of the objects or characters in the picture. The instrument which he operates is connected and controlled by the mechanisms just described in connection with Figs. 7 and 8, and the "sound marks", corresponding to the sounds and expressions produced, are recorded on the film of camera
115 28, it being understood that this camera is operated at precisely the same speed at which the picture projecting machine was operated. A developed negative containing the rows of "sound marks", but on which the spaces for the pictures are blank, is superimposed upon
120
125
130

a developed negative properly pieced and joined and having the pictures photographed thereon but having spaces for the "sound marks" left blank, and a print is made from this combined negative which will give a positive containing the pictures 4 and the corresponding rows of "sound marks" 3, shown in Fig. 3.

Another method by which these rows of "sound marks" 3 may be recorded so as to appear as shown in Fig. 3, is by making a marked or perforated roll of the music and sounds, such as is used in player pianos and automatic musical instruments. This roll is then moved in the direction of its length at the proper speed and is photographed through a slit by a motion picture camera, on the film of which the spaces for the pictures are not exposed to the light. The finished positive containing the pictures and "sound marks" in their proper positions may then be made by superimposing two negatives, as above described.

The method of photographing the "sound marks" 3 by the use of the motion picture camera necessarily involves a series of intermittent exposures, due to the operation of the motion picture camera shutter. It will be seen that some of the notes so photographed or marked will be of such length as to be recorded by "sound marks" extending over several consecutive pictures, while others may be of such brief duration as to be represented by "sound marks" contained on only one or two consecutive pictures. It is necessary to have the individual electric circuits so adjusted as to be sufficiently sluggish and therefore not disconnect the current when a certain "sound mark" is continued over two or more consecutive pictures, otherwise the note or sound which was intended to be sustained would not be reproduced continuously. On the other hand, the circuits must be so adjusted as to disconnect whenever their corresponding "sound mark" does not accompany a picture.

One method by which the circuits operating the electro-magnets can be made to hold over without disconnecting the current until the next consecutive row of "sound marks" is in position before the lens, is illustrated by the use of the apparatus shown in Fig. 10. The shutter 50 is equipped with two lugs 51 and 52 located as shown in Fig. 10, so that when the shutter 50 revolves before the projecting lens 53 they operate a switch 54 which makes and breaks the current flowing through wires 55 and 56. Lug 51 closes the circuit so that the electro-magnets energized by the "sound marks" 3 on the picture before the projecting lens remain energized until the film has passed behind the shutter and the next consecutive picture and row of "sound marks" is before the projecting lens; then lug 52 disconnects the current, at which

moment light from the next row of "sound marks" is projected to the selenium cells. Each note, expression lever or sound hammer 57 when operated or sounded makes contact with separate contact points 58 and 59. Contact points 58 are connected by a battery 60 or other source of current to the switch 54 at the shutter and the other wire 55 running from the switch 54 connects with a pole of each electro-magnet 61. The other pole of each electro-magnet is connected by a separate wire 62 to its respective contact point 59. 63 shows the positions of the keys when a piano is used. By this method whenever a sound or expression instrumentality is operated or sounded, each of the particular sounds or expressions is sustained until the next consecutive row of "sound marks" is in position before the projecting lens. The sustaining of the sounds and expressions is effected while the light falling on their corresponding selenium cells is screened off by the opaque sections of the shutter.

A further method of keeping the electro-magnet circuits from disconnecting until the next consecutive picture is in proper position before the lens, is to have the film made with the "sound marks" recorded thereon as shown in Fig. 11. This form of film is practically the same as that shown in Fig. 3, except that in the present form there are additional rows of "sound marks" 2^a, 2^b, etc., in the spaces which, in ordinary films, exist between the pictures. The "sound marks" 2^a are the same as those indicated at 3^a and the "sound marks" at 2^b are the same as those indicated at 3^b, etc. These identical rows of "sound marks" are always separated by the same number of pictures. In allowing the rays of light to pass through the "sound marks" a secondary projecting lens is used which is also focused on the selenium cells. This secondary lens is used only for the "sound marks" 2^a, 2^b, etc., and the main projecting lens is used to allow the rays of light to pass through the "sound marks" 3^a, 3^b, etc. As the rays of light from main lens passes through the "sound marks" 3^a, "sound marks" 2^a appear in position before the secondary lens. As soon as the shutter is about to screen off marks 3^a then the rays of light from the secondary lens passes through 2^a and thus the identical marks are projected and superimposed on the selenium cells. This row of marks 2^a remains before the secondary lens until 3^b have replaced 3^a before the main projecting lens, then a shutter screens off 2^a and in a similar manner 2^b next appear before the secondary projecting lens. In this manner, although the film is moving intermittently before the main lens, yet the selenium cells are properly kept in the path of the light until the next row of "sound marks" is in position before the main lens.

By the methods just described the action in the motion picture will be synchronous with the accompanying sounds. Should the film break, as happens in operating motion picture machines now in use and should the operator piece together the broken film, the sound and action on the mended film will still remain synchronous, even though one or more pictures of the film be left off as the corresponding "sound marks" for the accompanying sound will have been removed with the pictures.

The method in which the "sound marks" are photographed on a separate film adapted to be continuously driven and geared to the sprocket turning the picture film will next be described. As shown in Fig. 4, a separate film 29 is used for the "sound marks" and instead of having them formed in rows between the pictures, as described in connection with Figs. 1 to 3, the marks for each note, expression element or sound instrument are continuous. The "sound marks" 3' consist of transparent marks parallel to the direction of the length of the film and vary in length in direct proportion to the length or duration of the sound which they represent. Here the "sound marks" 3' are similar in appearance to the slits or perforations of the ordinary music roll used in player pianos and automatic musical instruments of that type. This sound film 29 can be photographed from an operating piano or mechanism, such as illustrated in Fig. 7 and described in connection therewith, except that the reel in the photographing camera 28 must move before the lens at a constant continuous speed and not intermittently and with no shutter interference. This can be done by removing the shutter and intermittent sprocket mechanism of the ordinary motion picture machine. As described in connection with the method illustrated in Figs. 1 to 3 and 7 and 8, this film may be made by first making a perforated roll of the sound accompaniment, such as is used for player pianos and then while this roll is moving in the direction of its length and at the proper speed, photographing it through a slit by a motion picture camera from which the shutter and intermittent sprocket mechanism have been removed. The mechanism holding the film 29, having the "sound marks" photographed thereon, is geared to the sprocket 30, by suitable mechanism 31, of the picture film 32, or it is geared to a mechanism adapted to turn the sound film at the same speed at which it was moving when photographed and thus produce the sounds synchronously with the accompanying pictures. It will be understood that separate lenses are used for the purpose of projecting the pictures of the film 32 and the "sound marks" 3' of the film 29. The film 32 will operate in the inter-

mittent manner before the projecting lens used in exhibiting motion pictures and will be thus projected to the screen. The accompanying sound film, however, must move at a constant continuous speed before the lens, which is to project the rays of light through the "sound marks" 3' on to their respective selenium cells. This can be effected by a take-up mechanism shown in section in Fig. 9. Here the film of "sound marks" 29 unwinds from the spool 33 at an intermittent speed proportionate to the intermittent speed of the picture film 32 to which it is geared. It then passes over sprocket 34 behind a guide bar 35 to form a loop 36 back of a second guide bar 37 and over a second sprocket 38 and then moves at a constant continuous speed in front of a projecting lens 39, which projects and disperses the rays penetrating the "sound marks" 3' to their corresponding selenium cells located in the path of these rays and connected to their corresponding source of current, relay, electromagnets, and sound producing instruments, as hereinbefore described. If the sprocket 38 is turning at a constant continuous speed it will allow the sound film to pass at such speed before its projecting lens 39, while the loop 36 of the film will decrease and increase in size and supply sufficient lengths of the film, to permit of this constant continuous speed over sprocket 38 and yet allow the film to pass intermittently over sprocket 34 in the direction of the arrow *a*.

Should the sound or picture film described in this method break, to maintain synchronism in the operating of the two films, it would be necessary in repairing the broken film to add a proportionate amount of blank film and thereby keep both films of the original proportionate length.

Referring to Figs. 5 and 6, the invention is shown as applied to a film of double width, one-half of which contains the pictures 38 while the other half contains the "sound marks" 3' formed similarly to those illustrated and described in connection with Fig. 4: The film 40 in this instance, is provided with an additional row of perforations 41 to fit cogs on the mechanism in order to prevent buckling of the film in operating it through the projecting machine. The film could be made in a manner similar to that described in connection with the method illustrated by Fig. 1 but it will be necessary in projecting this film to have the "sound marks" moved at a constant continuous speed before its projecting lens, while the pictures must be moved before the lens which projects them in the intermittent manner usually employed in projecting motion pictures. A convenient way to obtain the film 40 is to first photograph a negative of the original sound film and place it side

by side with a finished and pieced negative of the corresponding picture film, then from the two print a one piece double width positive, such as shown in Fig. 5. The "sound marks" do not necessarily have to be immediately opposite or adjacent to the particular picture or pictures which they are to accompany in order to have synchronism between the two in projecting. The "sound marks" ³² do not pass in front of the lens 42 but to one side of it and consequently are not projected by it. The lens 42 is used to project the pictures as the film 40 comes from the reel 43. After passing the lens 42 the film passes over a take-up mechanism similar to that shown and described in connection with Fig. 9, except that in the present case the sprocket 44, bars 45 and 46, and sprocket 47 are broad enough to accommodate the widened film containing both the pictures and the "sound marks" adjacent to one another. From the take-up mechanism the film passes before the lens 48 and is wound upon reel 49. Lens 48 is used for projecting the rays of light through the "sound marks" and is offset to one side of lens 42. On passing over the sprocket 47 the film is moved at a constant continuous speed instead of intermittently as when passing before lens 42. It will thus be seen that from this arrangement the pictures 38' are intermittently fed so as to be projected by the lens 42 while the "sound marks" ³² are passing simultaneously to one side of the lens and therefore not receiving light therefrom. Then later as the film moves with a continuous constant motion before lens 48, the rays of light pass through the "sound marks" ³² while the pictures are moving to one side of the lens and receive no light therefrom.

Should the operator have reason to mend a broken film, such as is used in this method, the synchronism of sound and action will not be destroyed in operating the mended film, for every section of the picture film removed a corresponding length of the sound film could be removed.

While I have shown the present invention as applied for the purpose of reproducing sounds, such as the playing of a piano, etc., it is to be understood that the invention is not limited to the particular examples illustrated and described in the present case, as various other instruments and sound producing mechanisms can be equally well operated by the use of this method, the electro-magnets either depressing the notes and expression pedals as described or controlling stops in front of tracker-board apertures in electrically operated instruments.

Having described my invention what I claim is:—

1. The hereindescribed method of producing musical sounds and the like syn-

chronously with the actions in a motion picture film that is being projected, consisting in photographing upon a film sound marks in given relation to the pictures, simultaneously projecting the pictures and rays of light through the sound marks, whereby the pictures will be thrown on a screen and the light from the sound marks will be directed upon selenium cells to close electric circuits and operate suitable sound producing instruments.

2. The herein described method of producing musical sounds and the like synchronously with the actions in a motion picture that is being projected, consisting in photographing pictures on certain portions of a picture film, recording rows of sound marks on other parts of the film, and simultaneously projecting the pictures upon a screen and rays of light through the sound marks upon the light operated means controlling certain sound producing instruments.

3. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising, a film having picture scenes and sound marks photographed thereon, means for simultaneously projecting the pictures and rays of light through the sound marks, sound producing instruments, and light controlled means upon which the sound marks are projected for operating said sound producing instruments.

4. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a film having sound marks and pictures contained thereon in a given relation, sound producing instruments, light operated means adapted to operate said instruments, and means for simultaneously projecting said pictures and rays of light through said sound marks onto said light operated means.

5. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture film having sound marks thereon, sound producing instruments, electro-magnetic operating means therefor, electric circuits including said electro-magnetic means, light-operated means for closing and opening said circuits, and means for simultaneously projecting the pictures and light through the sound marks on to said light-operated means.

6. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture film having sound marks thereon, sound producing instruments, electro-magnetic means for actuating said instruments, a plurality of selenium cells, electric circuits including said selenium cells and electro-magnets, and means for simul-

taneously projecting the pictures and rays of light passing through said sound marks on to said selenium cells for opening and closing said circuits.

5 7. A motion picture machine comprising in combination, a plurality of independently operable sound producing elements, and light operated means automatically controlled by the film for independently operating said elements synchronously with the
10 actions of the pictures.

8. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture-film having horizontal
15 rows of transparent sound marks on sections thereof immediately preceding each picture, sound producing instruments, electro-magnetic means for actuating said instruments, a plurality of selenium cells,
20 electric circuits including said selenium cells and electro-magnets, light operated means for opening and closing said circuits, said light operated means being adapted to be
25 controlled by the rays of light through the sound marks.

9. Apparatus for synchronously produc-

ing musical sounds and the like to accompany the projection of motion pictures comprising a picture-film having horizontal
30 rows of transparent sound marks on sections thereof between the pictures, sound producing instruments, electro-magnetic operating means therefor, electric circuits including said electro-magnetic means, light
35 operated means for closing and opening said circuits, said light operated means being adapted to be controlled by the rays of light through the sound marks.

10. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a film having picture scenes and
40 sound marks photographed thereon, means for simultaneously projecting the pictures and rays of light through the sound marks, means for reducing the magnified light rays from the sound marks, sound producing instruments, and light controlled means upon
45 which the sound marks are projected for operating said sound producing instruments.
50

In testimony whereof I affix my signature.

ELMER LEWIS GREENSFELDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

AUTOMATIC RECORD REPEATING MEANS FOR PHONOGRAPHS
AND THE LIKE.

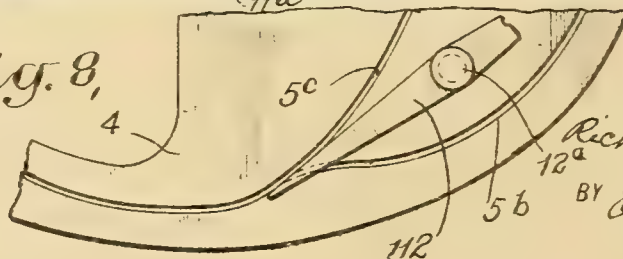
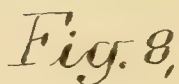
1,255,117 ----- R. J. Prettie,
Filed July 31, 1915,
Patented Jan. 29, 1918.

AUTOMATIC RECORD REPEATING MEANS FOR PHONOGRAPHS AND THE LIKE.

Patented Jan. 29, 1918.

3 SHEETS—SHEET 1.

Fig. 1.



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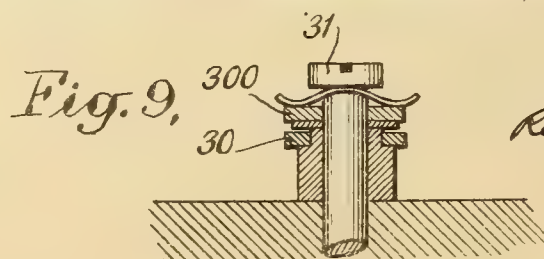
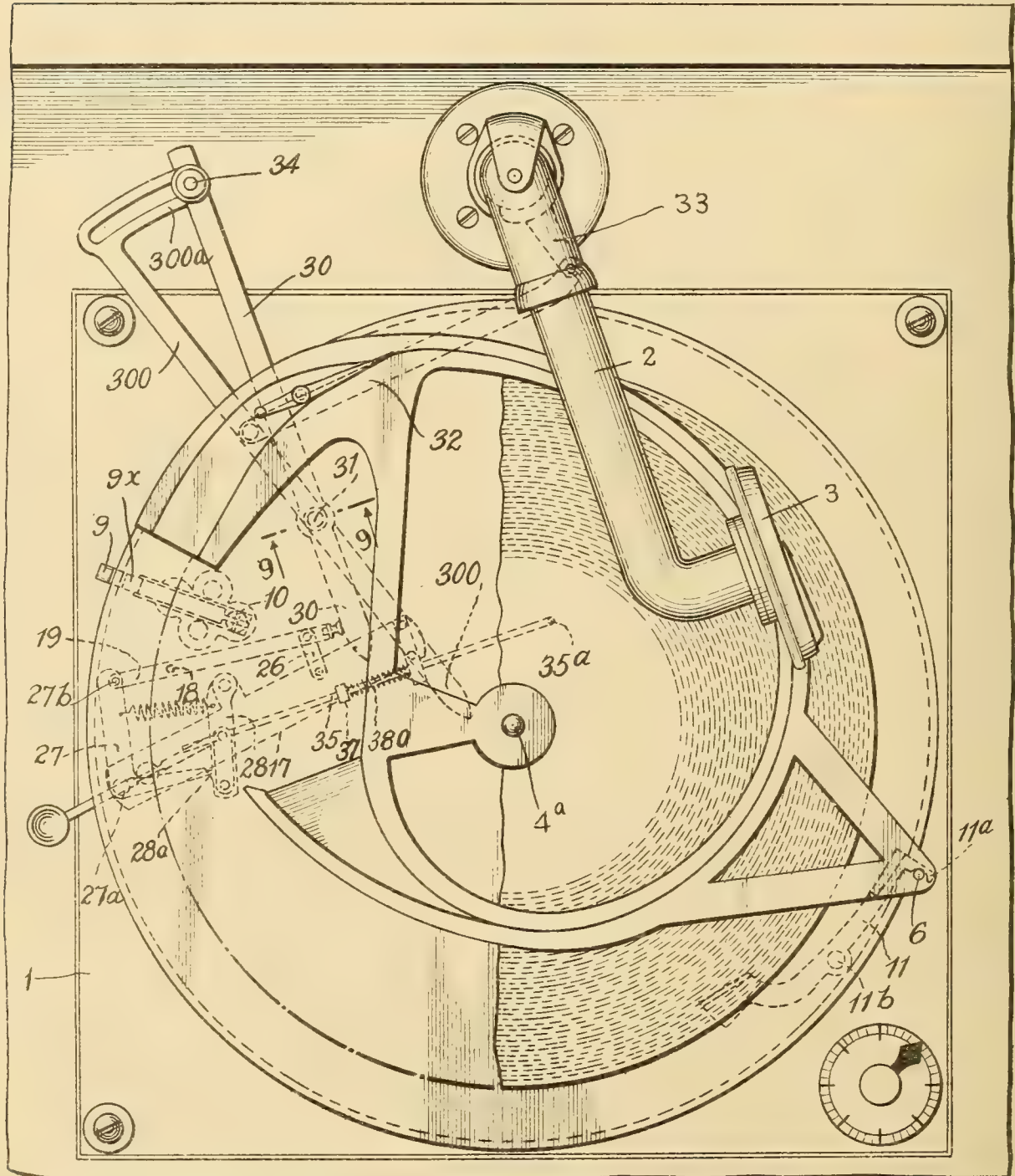
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1,255,117.

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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

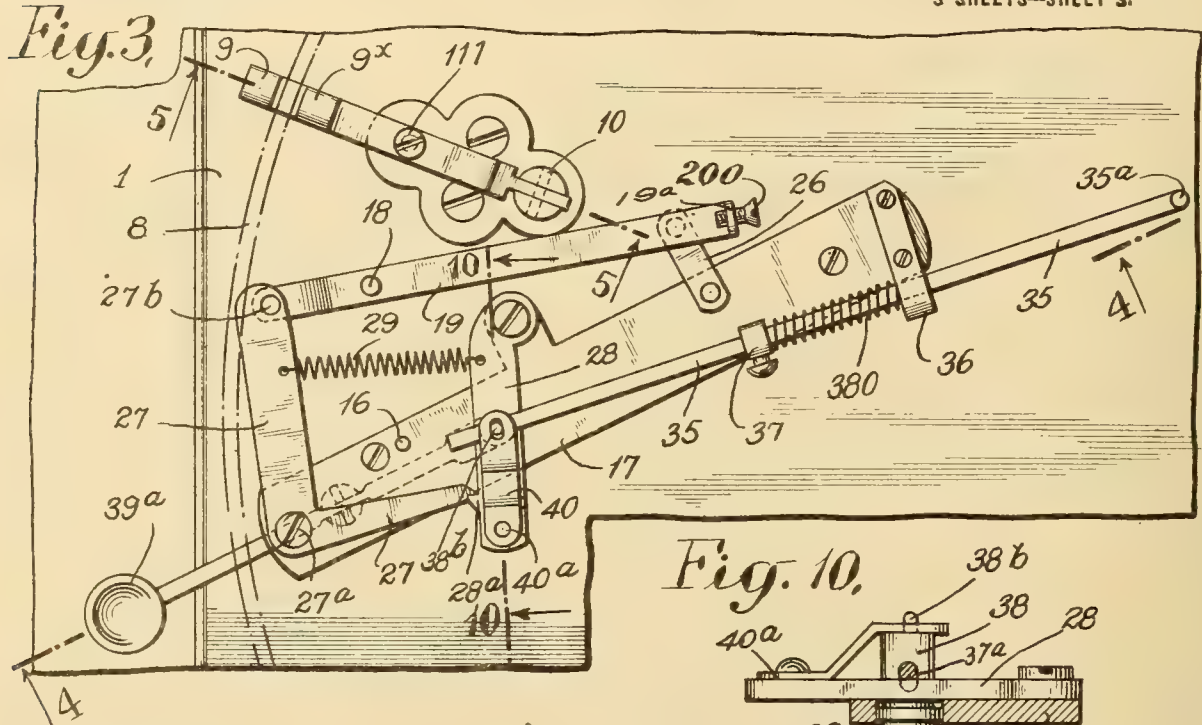


Fig. 10.

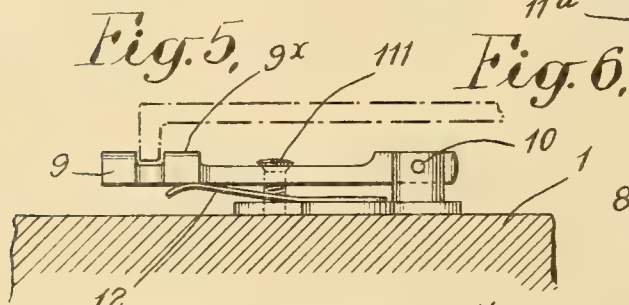
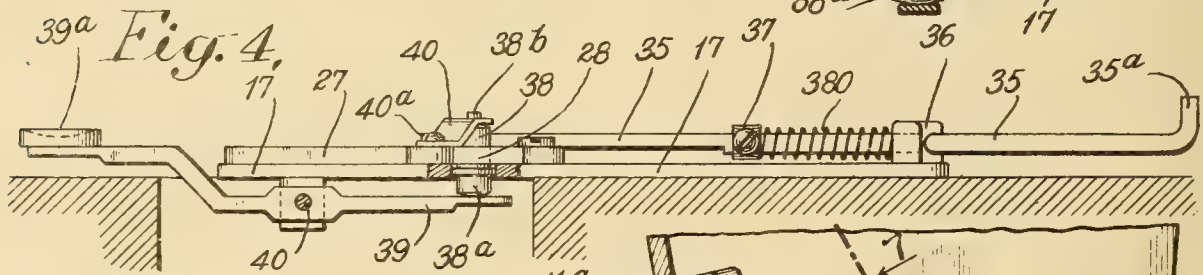
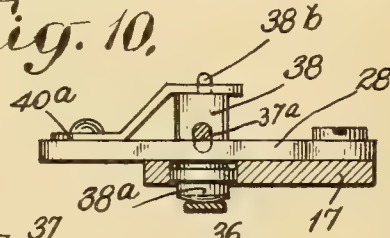


Fig. 6.

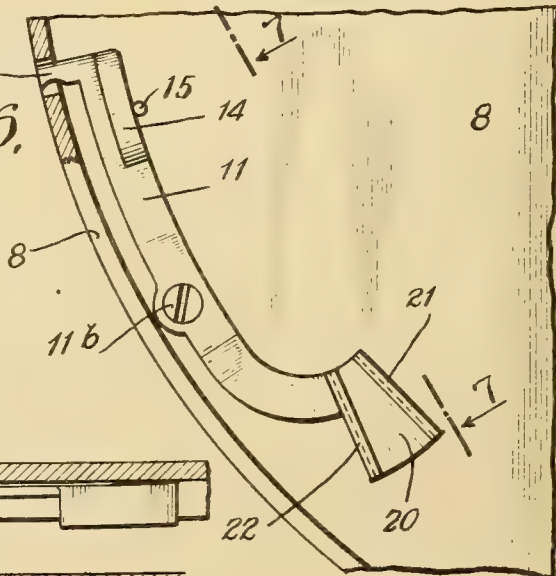
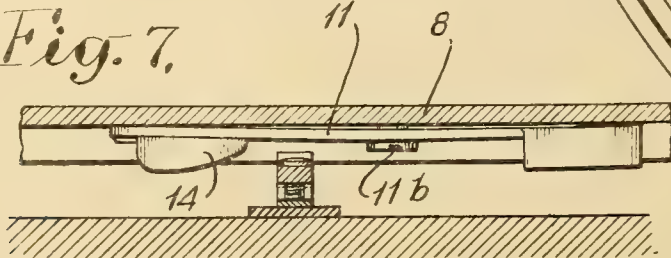


Fig. 7.



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AUTOMATIC RECORD-REPEATING MEANS FOR PHONOGRAPHS AND THE LIKE.

1,255,117.

Specification of Letters Patent.

Patented Jan. 29, 1918.

Application filed July 31, 1915. Serial No. 42,950.

To all whom it may concern:

Be it known that I, RICHARD JAMES PRETTIE, a citizen of the United States, residing at Jamaica, in the county of Queens and State of New York, have invented certain new and useful Improvements in Automatic Record-Repeating Means for Phonographs and the like, of which the following is a specification.

My present invention relates to automatic record-repeating means for phonographs and the like, the features and advantages of which will be apparent to those skilled in the art from the following description in connection with the drawings.

In the latter, Figure 1 is a plan view of a phonograph comprising one embodiment of my record-repeating means, said figure showing the parts in set position with the record playing; Fig. 2 is a similar view except that the parts are shown in tripped position with the needle and sound-box lifted off the record and in the act of being carried back by the conveyer to be replaced on the record at its starting point; this figure further illustrates a change in the adjustment of the device to make it do this for a smaller record, *e. g.* a 10 inch record, whereas Fig. 1 shows the adjustment for a 12 inch record. Fig. 3 is a plan view, on an enlarged scale, of the mechanism underlying the turn-table; Fig. 4 is a vertical section partly in elevation on the line 4—4 in Fig. 3 looking in the direction of the arrows; Fig. 5 is a similar view on the line 5—5 in said Fig. 3; Fig. 6 is an underneath fragmentary view of the turn-table on a larger scale to illustrate the movable dog carried thereby; Fig. 7 is a vertical section partly in elevation on the line 7—7 in Fig. 6 looking in the direction of the arrows; and Fig. 8 is an enlarged detail of Fig. 1, the switch member being shown adjusted as for a ten inch record, Fig. 9 is an enlarged sectional view on the line 9—9 in Fig. 2, looking in the direction of the arrows; and Fig. 10 is a vertical section on line 10—10 in Fig. 3.

I will now describe the specific devices of the drawings and their operation:—1 is the top of the motor and horn compartment of a phonograph, 2 is the tone-arm and 3 the sound-box shown supposedly in playing position with the needle on the record. 4 is a conveyer having a spiral groove 5 whose

mouth 5^a is widened and downwardly beveled to scoop up the needle at any desired point near the end of record. The conveyer has a center hole 4^a through which freely passes the upper end of the turn-table spindle. The conveyer may be made of any suitable or desired material such as hard rubber, celluloid, fiber, metal etc. and is surfaced on the bottom with a thin layer of felt or the like which rests on the record 7 without scratching it.

During the time that the rotating record is playing or sounding, the conveyer is held stationary by a pin 6 (see left side of Fig. 1) which projects downwardly from it adjacent the rim of the turn-table 8, said pin being stopped by engaging with the stop member 9 as it tries to rotate with the conveyer 4 due to the latter's frictional contact with the record. This stop member 9 is on the board 1 and is further illustrated in Figs. 3 and 5 from which it will be seen that said member is pivoted at 10 for movement in a vertical plane. A headed pin or screw 11¹ passes freely through it and a spring 12 tends to keep it pressed upwardly against the head of said screw. There is a groove in the top of the stop member to receive into it the rim of the turn-table without touching it.

When the sound-box needle reaches the particular part of the record in front of the widened mouth 5^a of the conveyer groove which the operator has chosen for the record to end and the repeating operation to occur, then the latter automatically takes place, the operation consisting briefly in the conveyer 4 being positively driven from the turn-table after the stop 9 has been withdrawn, with the result that the conveyer makes one complete rotation and then is automatically checked again by the stop 9. During this rotation of the conveyer, the sound-box needle is first scooped off the record into the mouth 5^a of the conveyer groove and is then swung gradually outwardly until the end of the groove delivers the needle to the starting groove of the record whereupon the repetition or replaying of the record begins.

Continuing now with the description of the means by which this is accomplished:—

11 is a dog pivoted at 11^b to the underside of the turn-table. The toe 11^a of this dog is opposite an opening in the rim of the turn-table (Fig. 6) through which it is adapted to

be projected as in Fig. 2 or withdrawn as in Fig. 1. A pin 15 on the turn-table acts to limit the in-position of the dog.

14 is a cam on the underside of the dog (Figs. 1 and 7) which in the out-position of the dog as in Fig. 2 rides over the high portion 9^x of the stop 9 and depresses said stop below the end of the pin 6 on the conveyer 4, so that both can rotate with the record beyond said stop. On the other hand, in the in-position of the dog, the cam 14 passes freely over the low part of the stop to the right of 9^x (Figs. 1 and 5) and consequently has no effect upon it.

The other end of the dog on its underside has a groove 20 located between two inclined walls 21 and 22. 18 is a pin projecting upwardly from an endwise movable part 19 (Figs. 1 and 3). This part 19 is adapted to be latched in an outer position wherein its pin 18 passes freely through the groove 20 of the dog 11 when the latter is in its in-position and is rotating with the turn-table. On the other hand, when unlatched, the part 19 is spring impelled inwardly a short distance so that its pin 18 now strikes against the wall 21 of the groove in the rotating dog and pivots its toe 11^a outwardly into projecting position. Further it will be understood that means is provided for automatically latching the part 19 carrying the pin 18 in its aforesaid outer position whenever the sound-box needle is at or about the starting groove of the record; also for automatically unlatching said part whenever the needle of the sound-box reaches a predetermined sound-groove at or near the end of the record so that thereupon said part 19 is automatically impelled inwardly a short distance to carry the pin 18 into the above described position wherein it pivots the toe 11^a of the dog outwardly.

With the foregoing in mind, the general mode of operation will now be clear. The conveyer 4 will be laid on the record as in Fig. 1 and the record started into rotation. The conveyer cannot rotate because its pin 6 abuts against the stop 9. The sound-box needle will then be brought out to the starting point of the record and lowered into contact. This will start the record playing and will at the same time latch the pin 18 in its outer position wherein it passes freely through the groove 20 in the rotating dog 11. These conditions continue until the record has been fully played up to the point previously predetermined by the operator (the means for this being later described) whereupon the needle will have reached one of the grooves in front of the mouth piece 5^a. This will automatically unlatch the part carrying the pin 18 causing it to move into its inner position wherein it strikes against the wall 21 of the grooved dog and forces its toe 11^a into projecting position.

Just before this toe, as it rotates with the turn-table, picks up the pin 6 of the conveyer 4, said pin and conveyer are automatically released from the stop 9 by the cam 14 on the dog bearing down on the high part 9^x of the stop. The rotating toe 11^a now picks up the pin 6 and rotates the conveyer positively with the turn-table and the record. The result is that the sound-box needle is scooped up by the conveyer and delivered at the outside of the record, which then begins to replay. At the same time, the aforesaid means later to be described latches the pin 18 back in its original position. In this position of the pin, the side 22 of the groove in the dog strikes against the pin 18 which swings the dog into its in-position, so that the conveyer is no longer positively driven by the dog but on the contrary is merely carried by frictional contact with the record for a short distance further until the pin 6 strikes against the stop 9. The record now continues playing, the pin 18 freely threading through the groove in the dog, until said pin is again automatically unlatched as before at the end of the record, whereupon the same cycle of operations occurs, and so on indefinitely.

Referring to Figs. 1 and 8, it will be noted that the delivery end of the conveyer groove 5 divides into two grooves, an outer groove 5^b which delivers to the starting point of a large record, *e. g.* a 12 inch record, and the inner 5^c which similarly delivers relative to a smaller or 10 inch record. 122 is a switch member pivoted to the conveyer member at 12^a, a friction being provided so that it takes quite a little pressure on the operating handle 12^b to swing it. It is so located that its free end can be adjusted to obstruct either of the delivery grooves 5^b or 5^c without obstructing the other. Fig. 1 shows it adjusted for repeating a 12 inch record, the sound-box needle being delivered by way of the outer groove 5^b. Fig. 8 shows it adjusted for repeating a smaller record by way of the inner groove 5^c.

I will now describe the aforesaid means for automatically latching and unlatching the part 19 bearing the pin 18, the latching occurring from the conveying of the sound-box to the starting point and the unlatching from its reaching the predetermined end-point of the record:—26 is a link connecting the endwise movable part 19 with the stationary part 17. 27 is a bell-crank lever fulcrumed at 27^a on the stationary part 17, one limb being pivotally connected at 27^b to the part 19. The other limb extends toward a latch 28 which is pulled toward it by a tension spring 29 connecting the latch with the outer limb of the bell-crank. The latch 28 has a beveled latch-projection 28^a adapted to interlock as shown

in Figs. 1 or 3 with the toe of the bell-crank to hold the member 19 and its pin 18 releasably in their outermost position, wherein it will be remembered said pin passes idly through the groove 20 in the dog 11 when in its in-position of Fig. 1 or wherein it restores said dog to said in-position in case it is in its out-position shown in Fig. 2.

The part 19 has an upstanding end 19^a into which is tapped an adjustable screw 200; and the part 19 and its pin 18 are automatically latched in their aforesaid outermost position by the operating finger 30 pivoted at 31 to the board 1 being swung into contact with the screw 200 and forcing the part 19 endwise until the part 27 latches with the latch-part 28. This occurs whenever the conveyer 4 has fully delivered the sound-box to the starting point of the record due to the link connection 32 between a finger 300 subsequently referred to and a crank-arm 33 projecting radially from the vertical neck of the tone-arm 2.

Analogous to the finger 30 is the aforesaid finger 300 swinging freely on the same pivot 31 (Fig. 9). This finger 300 differs in having a longer toe portion and further in having a slotted head 300^a receiving the shank of a set-screw 34 tapped into the underlying other finger 30. Adjusting the set screw to the left end of the slotted head and tightening it, the two fingers 30 and 300 swing as one and due to the described operative connection with the tone-arm act to latch or set part 19 and pin 18 when the sound-box has been conveyed outwardly to one of the starting grooves of a large or 12 inch record; and vice versa acts to trip said latched part when the predetermined ending groove of the 12 inch record is reached.

On the other hand when the set-screw 34 is tightened at the right hand end of the slotted head 300^a as in Fig. 2, again the two operating fingers swing as one about their common pivot 31 but now they latch and unlatch the part bearing the pin 18 from the starting and ending positions respectively of the sound-box on a small or 10 inch record.

This unlatching means for both sized records comprises a piece 35 of round-wire having one end bent to form an upstanding projection 35^a. This member 35 is slidable endwise through a hole in a stationary lug 36 on the plate 17. 37 is a collar on the member 35 between which and the lug 36 is a compression spring 380 which gives the member a normal tendency to slide endwise toward the latch 28. The latch-end of the member 35 is flattened to give a flat-bottom thereto which rests slidably on top of the latch 28 and incidentally prevents the wire 35 from rotating in the lug 36 and so keeps the projection 35^a always upright. Said flattened end of the wire 35 threads through

a vertically elongated eye 37^a in a pin 38 supported loosely for vertical adjustment in a hole through the latch 28 and a slightly larger hole through the base-plate 17. The head 38^a of the pin rests on the end of the finger lever 39 centrally pivoted at 40 between lugs on the underside of the base-plate 17. This portion of the finger lever with the related parts is located in a hole or recess in the board 1 (Fig. 4), whence the finger-end of the lever 39 projects and is provided with the button 39^a. 40 is a leaf-spring secured at one end 40^a to the latch 28 and at the other end being arranged to bear down on the pin 38 so that the member 35 is normally frictionally gripped and held stationarily between the top face of the eye 37^a in the pin and the top of the latch 28. To keep the parts in proper relationship, this spring 40 has a perforation into which projects a reduced portion 38^b of the pin 38. This gripping action due to the spring 40 is released by depressing the aforesaid button 39^a because then the toe of the lever 39 lifts the pin 38 against the contrary action of the spring 40 and so releases the wire-member 35 from the grip between the top of the eye 37^a and the surface of the latch 28, whereupon the compression spring 380 is free to assert itself by impelling said wire member 35 endwise.

The operation of the aforesaid mechanism for unlatching the part 19 bearing the pin 18 so that the latter as described swings the dog 11 into its out-position and otherwise initiates the picking of the sound-box from the end of the record and its return to the starting point is as follows: When the sound-box has traveled sufficiently far toward the center of the record for the end of one of the fingers 30 or 300, swinging to the right in Fig. 1, to press against the projection 35^a on the member 35, it will pull said member endwise and release the latch 28 from the elbow-lever 27, whereupon the spring 29 will pull said lever and the part 19 bearing the pin 18 into their innermost position wherein said pin initiates the repeating operation.

Further be it noted that the operator can adjust the device so as to repeat as aforesaid at any given point in the end-part of the record. He will do this by first positioning the sound-box so that the stylus is located on the part of the record at which it is desired for the repeating operation to begin, and will then depress the button 39^a. Thereupon the spring 380 will impel the rod 35 endwise until its projection 35^a strikes against the operating finger 30 or 300 depending upon the size of the record being played. The operator will then release the button, which will result in the rod 35 being secured to the latch 28 with the projection 35^a located in just the right position to

be pressed by the given operating finger when, in the subsequent playing of the record the stylus has reached the predetermined repeating position on the record. The operator will bring the sound box to the beginning point on the record and start it in rotation, whereupon for the reasons stated the record will automatically repeat itself indefinitely, the repeat each time being at the predetermined ending point.

What I claim is:—

1. In a phonograph repeat device, the combination, with a sound-box and a turntable; of a conveyer rotatable about the same axis as the turn-table and adapted at the ending of the record to pick up the sound-box and bring it back to the beginning of the record; means for normally holding said conveyer against rotation; means for automatically releasing said holding means when the sound-box reaches the end of the record; and driving means carried by said turn-table for movement relative to the same into position to engage said conveyer after the latter has been released from said holding means, thereby to cause said conveyer to rotate in unison with said conveyer.

2. In a phonograph repeat device, the combination of an operatively supported sound-box, a normally stationary conveyer adapted at the ending of the record to rotate with it and to pick up the sound-box and convey it to the beginning of the record, a releasable stop normally holding the conveyer stationary as aforesaid, a dog on the turn-table movable into and out of driving engagement with the conveyer, and means automatically operated when the sound-box reaches the end of the record to move the dog into driving engagement with the conveyer and also to release the stop.

3. In a phonograph repeat device, the combination of an operatively supported sound-box, a normally stationary conveyer adapted at the ending of the record to rotate with it and to pick up the sound-box and convey it to the beginning of the record, a releasable stop normally holding the conveyer stationary as aforesaid, a dog on the turn-table movable into and out of driving engagement with the conveyer, said dog when in driving position acting also to release the stop, and means automatically operated from the position of the sound-box to move the dog into its conveyer-engaging position when the sound-box is at the end of the record, and to move the dog out of its conveyer-engaging position when the conveyer has reset the sound-box at the beginning of the record.

4. In a phonograph repeat device, the combination of an operatively-supported sound-box and a stylus carried thereby, a conveyer rotatable with the record and hav-

ing a groove adapted to pick up the stylus at the end of the record and deliver the same to the beginning of the record, said groove dividing at its delivery end into two grooves, an inner and an outer adapted to different sized records, and switch means on the conveyer adjustable to guide the stylus into either delivery groove to the exclusion of the other.

5. In a phonograph repeat device, the combination, with a sound-box and a turntable; of a conveyer rotatable about the same axis as the turn-table and adapted at the ending of the record to pick up the sound-box and bring it back to the beginning of the record; a depressible stop normally engaged with said conveyer to hold it against rotation; and means automatically operated when the sound-box reaches the end of the record for depressing said stop, thereby to positively disengage it from said conveyer.

6. In a phonograph repeat device, the combination, with a sound-box and a turntable; of a conveyer rotatable about the same axis as the turn-table and adapted at the ending of the record to pick up the sound-box and bring it back to the beginning of the record; a depressible stop normally engaged with said conveyer to hold it against rotation; means automatically operated when the sound-box reaches the end of the record for depressing said stop, thereby to positively disengage it from said conveyer; and means for thereafter automatically coupling said conveyer to rotate in unison with said turn-table.

7. In a phonograph repeat device, the combination, with a sound-box and a turntable; of a conveyer rotatable about the same axis as the turn-table and adapted at the ending of the record to pick up the sound-box and bring it back to the beginning of the record; a stationary member secured to said conveyer; a stop normally engaged with said member to hold said conveyer against rotation; and means for automatically disengaging said stop from said member when the sound-box reaches the end of the record.

8. In a phonograph repeat device, the combination, with a sound-box and a turntable; of a conveyer rotatable about the same axis as the turn-table and adapted at the ending of the record to pick up the sound-box and bring it back to the beginning of the record; a stationary member secured to said conveyer; a stop normally engaged with said member to hold said conveyer against rotation; means for automatically disengaging said stop from said member when the sound-box reaches the end of the record; and a coupler carried by the turn-table for engagement with said member after the latter has been released by

said stop, thereby to cause said conveyer to rotate in unison with said turn-table.

9. In a phonograph repeat device, the combination, with a sound-box and a turn-
5 table; of a conveyer rotatable about the same axis as the turn-table and adapted at the ending of the record to pick up the sound-box and bring it back to the beginning of the record; a stationary member secured
10 to said conveyer; a stop normally engaged with said member to hold said conveyer against rotation; means for automatically disengaging said stop from said member when the sound-box reaches the end of the

record; a coupler carried by said turn-table 15 for engagement with said member to cause said conveyer to rotate in unison with said turn-table, but normally disposed in ineffective position for said engagement; and means for automatically shifting said cou- 20 pler relatively to said turn-table into position to engage said member when the sound-box reaches the end of the record.

In testimony whereof, I have signed my name to this specification this 30th day of 25 July, 1915.

RICHARD JAMES PRETTIE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CONTROL MEANS FOR SOUND REPRODUCING MACHINES.

1,255,143 ----- C. W. Ebeling,
Patented Feb. 5, 1918,
Filed Dec. 18, 1917.

C. W. EBELING.
 CONTROL MEANS FOR SOUND REPRODUCING MACHINES.
 APPLICATION FILED FEB. 7, 1916. RENEWED DEC. 18, 1917.

1,255,143.

Patented Feb. 5, 1918.
 3 SHEETS—SHEET 1.

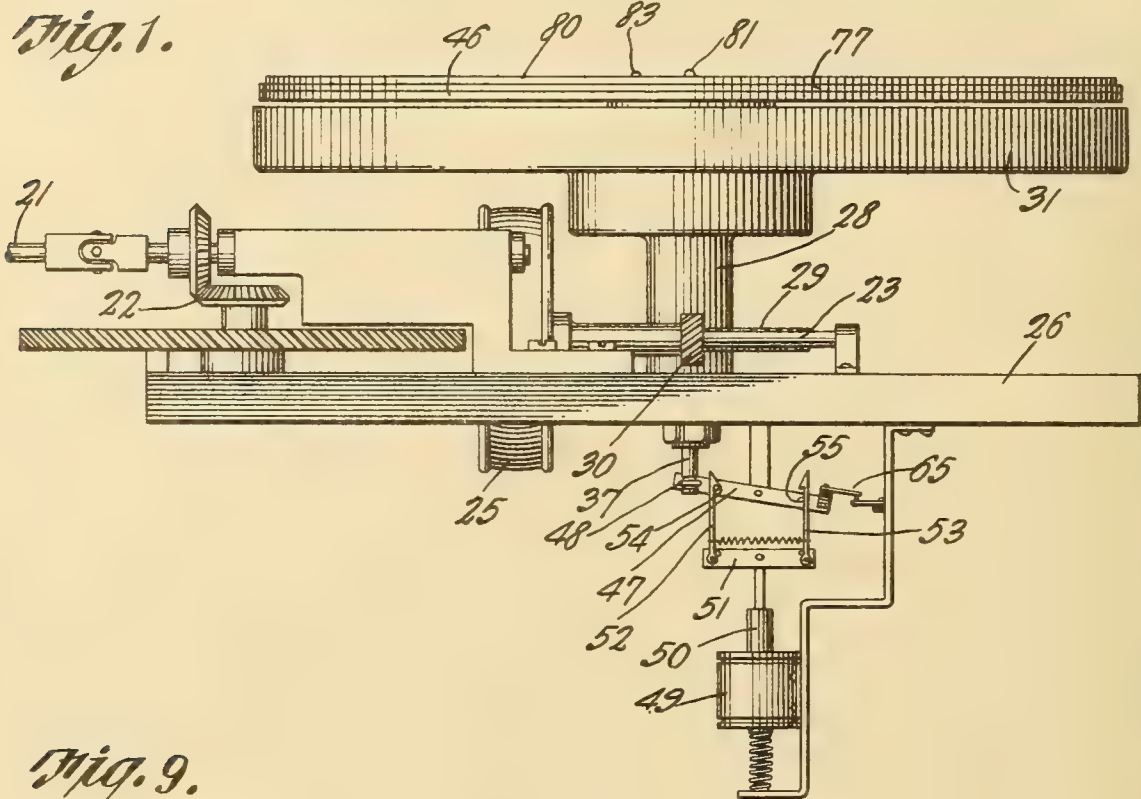


Fig. 9.

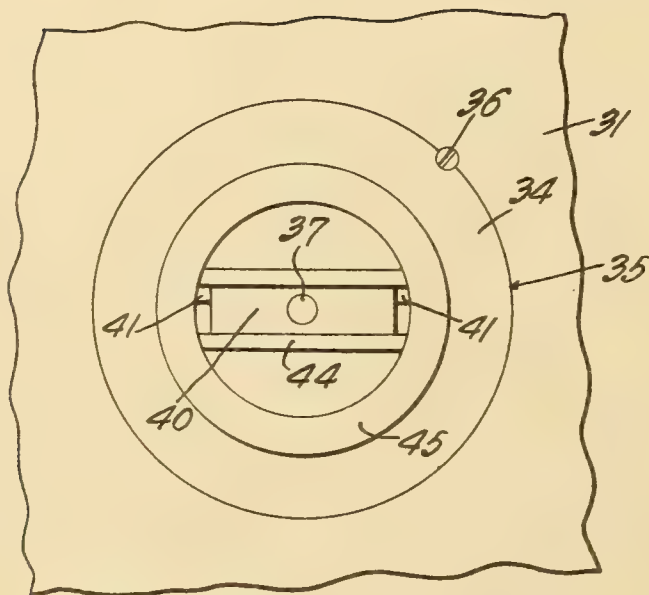
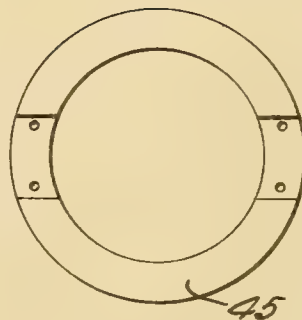


Fig. 10.



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3 SHEETS—SHEET 2.

Fig. 2.

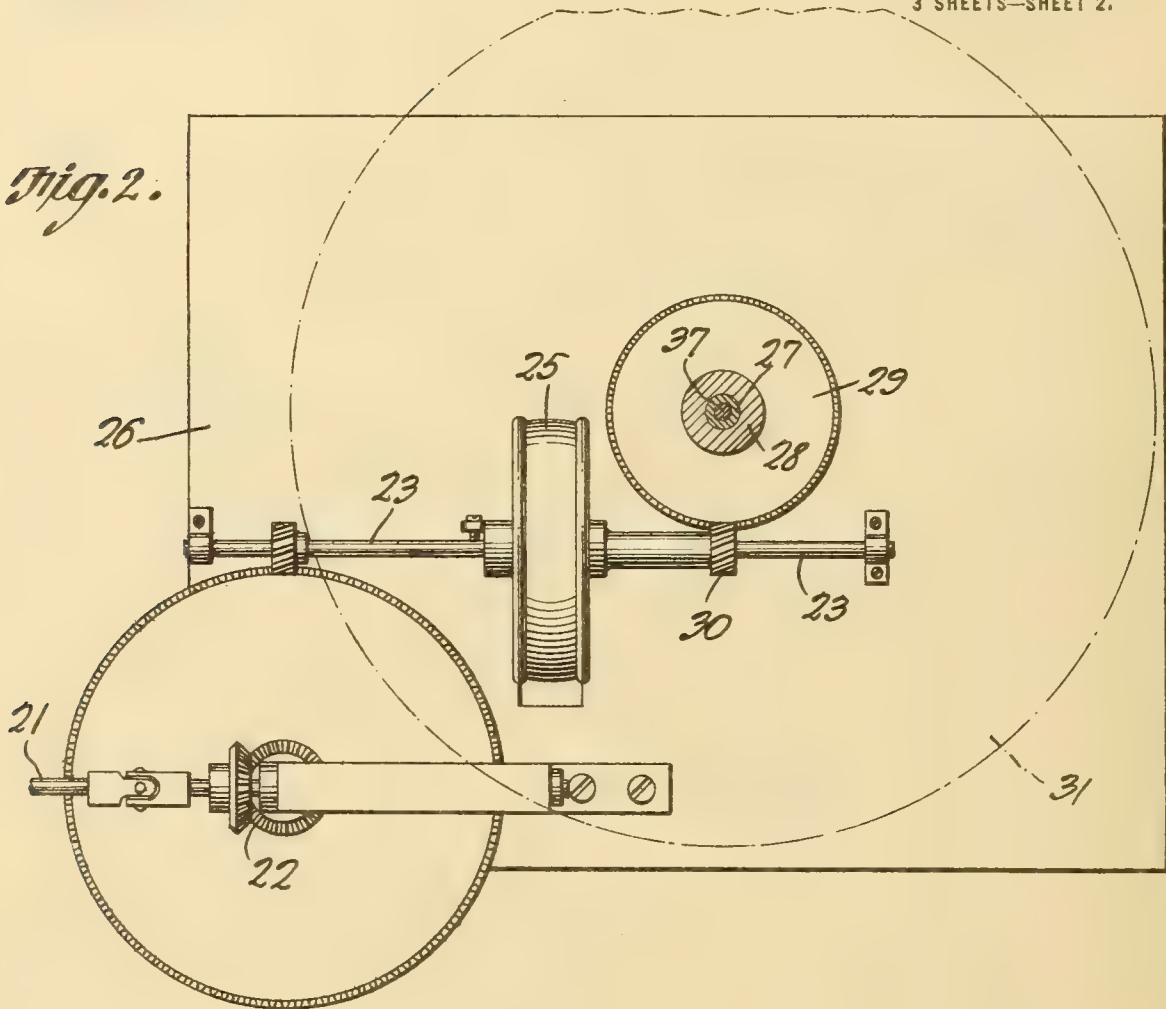


Fig. 5.

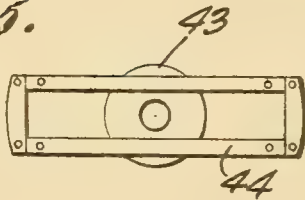


Fig. 6.

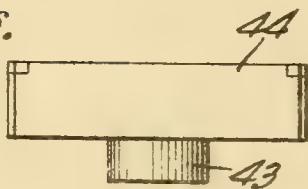
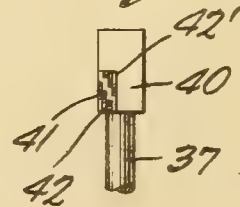


Fig. 7.



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1,255,143.

Patented Feb. 5, 1918.
 3 SHEETS—SHEET 3.

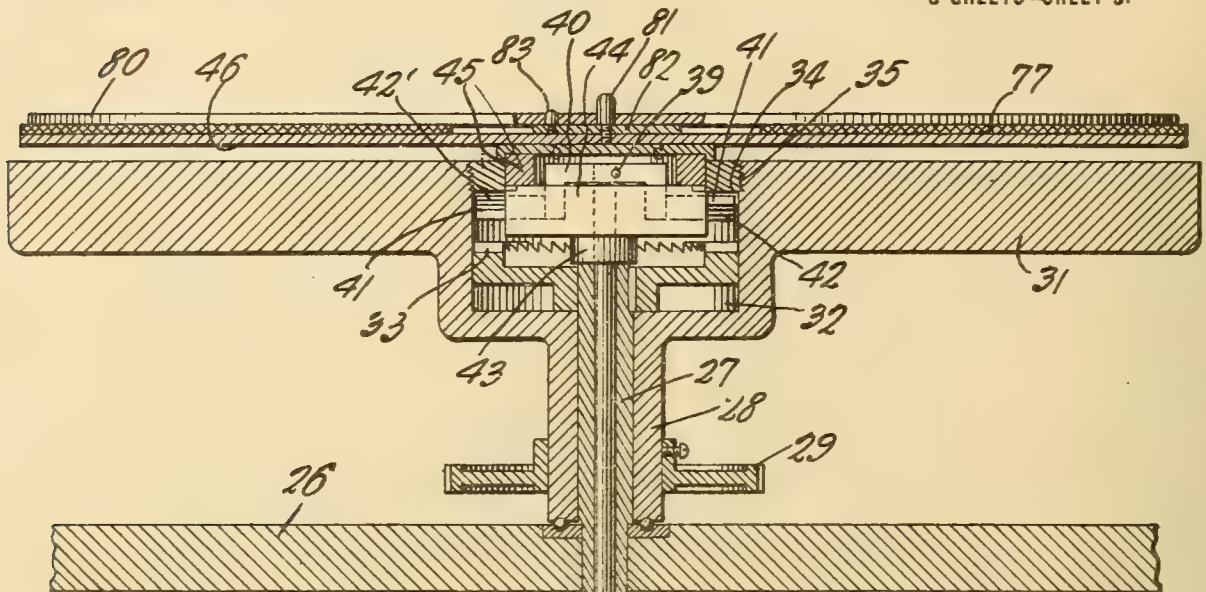


Fig. 3.

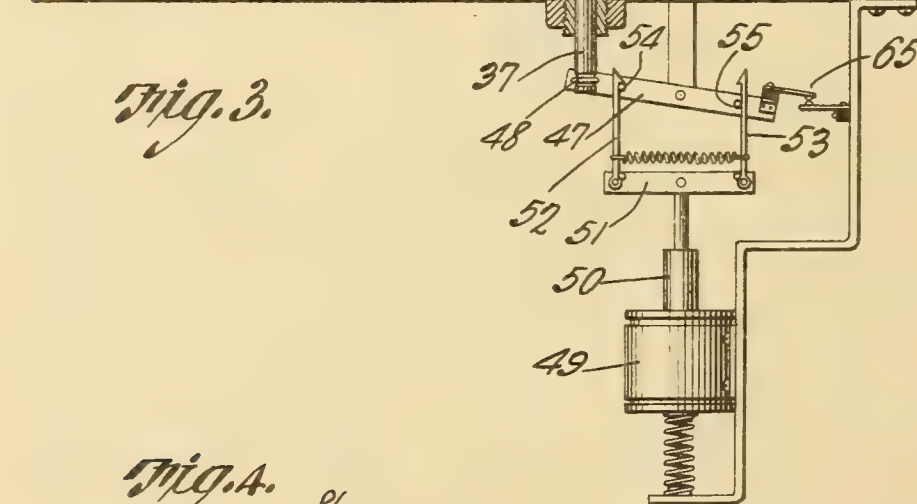


Fig. 4.

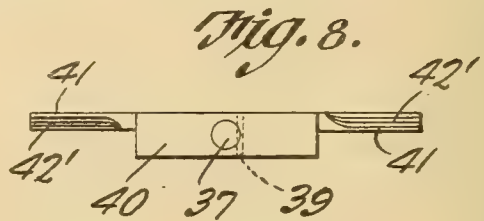
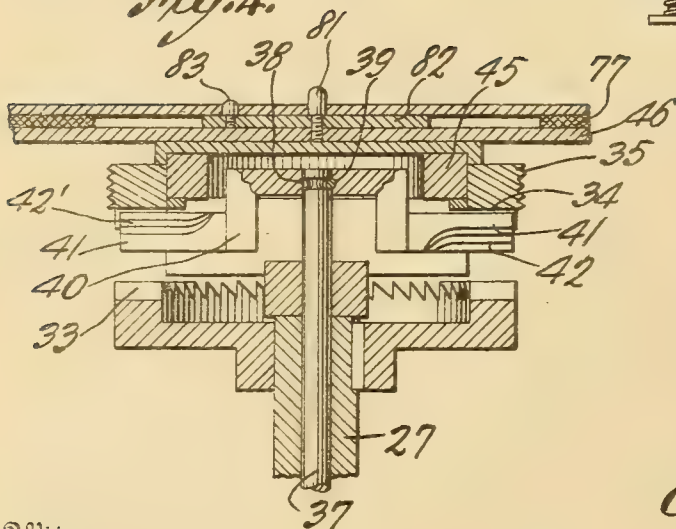


Fig. 8.

Witnesses

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CONTROL MEANS FOR SOUND-REPRODUCING MACHINES.

1,255,143.

Specification of Letters Patent.

Patented Feb. 5, 1918.

Application filed February 7, 1916, Serial No. 76,631. Renewed December 18, 1917. Serial No. 207,798.

To all whom it may concern:

Be it known that I, CHARLES W. EBELING, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Control Means for Sound-Reproducing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

In combining sound reproducing machines with motion picture mechanisms, there has been the inherent fault that the sound reproducing machine could not be started from an inert position to a full speed, and neither could such mechanism be brought to a stark standstill, to be started from such position again, and so on.

It is therefore the object of the present invention to produce a mechanism, that will start the sound reproducing mechanism from stark standstill to full or maximum speed, and without throwing any strain either upon the sound reproducing mechanism or the motion picture projecting mechanism.

To attain this object, I provide a continuously rotating momentum member, preferably a heavy disk, made in the form of a fly wheel, in combination with a record carrying member, which in turn is connected to and disconnected from the momentum member, so that it will be rotated with the momentum member from a standstill without affecting the speed of such member, it having been discovered that the sound record carried by the record carrying member can be halted in the middle of a word, and again started to continue and finish such word. The mechanism that forms the connecting link between the record carrying member and the momentum member, consists primarily of two opposed ratchets, one of which is carried by the rotating member and the other of which is stationary, in conjunction with a multiple pawl, which is provided with a plurality of oppositely disposed sets of ratchet engaging portions, whereby the ratchet will have one or more of its teeth engaged without any lost motion between the momentum and record carrying members. This feature makes it possible to stop and start the record with much precision and accuracy.

In order that the invention may be more fully understood and its numerous advan-

tages fully appreciated, attention is invited to the accompanying drawings, in which:—

Figure 1 is a front elevation of the sound reproducing means.

Fig. 2 is a top plan view thereof, the momentum member being removed.

Fig. 3 is a vertical cross section through the momentum device and the adjacent parts including the tablet support.

Fig. 4 is an enlarged detail sectional view through the momentum member showing the connecting mechanism.

Figs. 5, 6, 7 and 8 are detail views of the pawl and its carrier.

Fig. 9 is a top plan view of the center of the momentum member.

Fig. 10 is a bottom plan view of the annulus carried upon the underside of the record carrying member.

Referring to the drawings, the numeral 21 designates a shaft which is preferably driven from the motion picture projector machine, not shown, to operate in turn through the transmission mechanism 22 the shaft 23, which is made in two sections, with the compensating spring 24 and its housing 25 forming the connection therebetween. A base 26 carries most of this mechanism, and also carries the fixed tubular upright shaft 27, upon which is journaled the sleeve 28, carrying the gear 29, which meshes with the gear 30 of the shaft 23. As the sleeve 28 is formed integral with the momentum member 31, this member is rotated from the motion picture projecting machine, and it is desirable that it be rotated all the time.

A circular chamber 32 is provided in the upper face of the member 31, and the upper end of the shaft 27 projects therein to receive the fixed lower annular ratchet 33, while fitted in the mouth of the chamber is the upper annular ratchet 34, which through the threads 35 and the lock screws 36 is fast to and rotates with the member 31.

Projecting through the shaft 27 and mounted for both longitudinal and rotary movements is a rod 37, the upper end of which is grooved at 38 to receive the locking pin 39, so that the block 40, may be secured thereto for rotary movement, but must move longitudinally with the rod. Carried by this block and extending in opposite directions are the two pawls 41, each one of which is provided with the two oppositely disposed series of teeth engaging projections or

steps 12 and 12', the steps 12 being disposed to engage the teeth of the fixed ratchet 33, while the steps 42' are to engage the teeth of the other ratchet 34, only one ratchet being operated at a time.

The upper end of the rod 37 below the pawl carrying block is projected through the tubular boss 43 of the open frame 44, which in turn houses the block and also the major portion of the pawls, said frame being connected by screws or otherwise to the annulus 45 secured to the underside of the record disk or tablet carrying platform or member 46. Thus the platform or member 46 is always in position to be connected to or disconnected from the member 31. The elevating of the rod 37, moves the pawls into engagement with ratchet 34, and consequently connects the platform 46 with the member 31 through the frame 44, the block 40, the pawls 41 and the ratchet 34. The lowering of the rod 37 causes the pawls to disengage the ratchet 34 and to engage the fixed or stationary ratchet 33, thus halting the block 40, the frame 44 and the platform 46.

As each pawl is provided with the peculiarly formed ratchet teeth engaging ends, each step of which constitutes a tooth engaging, it requires a very slight movement of the momentum device to cause the engagement with its ratchet 34 or the ratchet 33, to connect and disconnect the platform 46, without any perceptible lost motion. This special pawl was designed after considerable testing, and was found to accomplish the result desired.

Several mechanisms for imparting the desired longitudinal movement to the rod 37, to control, the operation of the block 40 and the pawls from the motion picture projecting machine, and thus produce the desired synchronism between the two mechanisms when "talking" or "singing" moving pictures are being produced, or where it is desired to introduce verbal explanations of the pictures being projected, as for instance inserts used in the films, may be employed.

One form is here illustrated, and comprises a rocking arm or lever 47, mounted below the base, and operably connected as at 48 to the lower end of the rod 37. The solenoid 49 has its core 50 operably connected to the arm 51, which in turn carries the two pivoted pawls 52 and 53, whose hooked terminals coöperate with the pins 54 and 55, of the arm or lever 47, so that the arm or lever may be rocked and held in such selected position, and thus impart the desired movement to the rod 37 and the pawls, so that the platform 46 will be held inert or connected for rotation with the member 31.

The solenoid 49 is controlled from the film in any desired manner, the detail arrangement and construction of which it is not

deemed necessary to show in the present application.

As a telephone system is employed to convey the sound from the record tablet to various points in the auditorium a switch 65 is provided to open and close said circuit at the proper time, the circuit being open when the tablet is inert and closed when the tablet is revolved.

The upper surface of the platform 46 is covered with the usual sheet 77 of soft material to receive the sound record or tablet 80. The centering pin 81 is carried by the platform which has the center disk 82 held thereto by the pin 81 and also the other pin 83, which coöperates in holding the tablet 80 upon the platform 46. This arrangement of pins also assist in placing the record tablet for proper positioning in starting the same, in connection with the phonic groove of the record and the stylus of the transmitter.

What I claim as new is:—

1. In an apparatus of the character described, a continuously rotating driven member having a recess in one face thereof, and also having a clutch member, a stationary locking clutch member mounted in said recess, a driven member, and slidable means connected to the driven member and adapted to be engaged with either one of the clutch members, whereby the driven member is rotated with the driving member or held stationary.

2. In an apparatus of this character, the combination of a support, a continuously rotating member mounted thereon, a slidable member disposed axially of the rotating member, an engaging member carried thereby, a sound record support operably connected to the engaging member, two independent means, one carried by the rotating member and one stationary whereby when one means is engaged by the engaging member the record support is rotated by the rotating member and when the other means is engaged the record support is held stationary, and means for actuating the slidable member to select the position of the engaging member.

3. In an apparatus of this character, the combination of a support, a continuously rotating disk mounted thereon, a rod mounted axially of and for longitudinal sliding movement through the disk, a pawl carried by the rod, a sound record support operably connected to the pawl, two independent means one rotatable with and the other stationary relatively to the disk, whereby when one means is engaged by the engaging member the record support is rotated by the rotating member and when the other means is engaged the record support is held stationary, and means for actuating the rod.

4. In an apparatus of this character, the

combination of a support, a continuously rotating disk mounted thereon, a rod mounted axially of and for longitudinal sliding movement relatively to the disk, a pawl carried by the rod, a sound record support operably connected to the pawl, two oppositely disposed ratchets, one carried by the disk and the other stationary, said pawl being disposed for movement between the ratchets, and means for sliding the rod to connect the pawl with the ratchets, whereby the sound record tablet support is connected or disconnected relatively to the rotating disk.

5. In an apparatus of this character, the combination of a support, a continuously rotating disk mounted thereon, a rod mounted axially of and for longitudinal sliding movement relatively to the disk, a member connected to the rod and extending diametrically of the disk, said member being provided upon each end with two series of oppositely acting teeth, two rings, one of which is stationary and the other of which is fast to the disk, the opposed faces of said rings being toothed for coöperation with the teeth of the rod carried member, means for sliding the rod to cause either toothed ring to be engaged by the rod carried member, and a sound record tablet support connected to the rod carried member, whereby the latter is connected to or disconnected from the rotating disk.

6. In an apparatus of this character, the combination of a support, a continuously rotating disk having a concentric chamber, said disk being mounted upon the support, two rings, one made fast to the support and the other carried by the disk, both of said rings being within the chamber and the opposed faces of such rings being clutch faces, a sound record tablet support, a sliding rod mounted in the first support and connected to the record tablet support, a clutch member carried by the rod for engagement with one of the rings at a time, and means for sliding the rod to cause the clutch member to engage either ring at a time and thereby connect or disconnect the tablet support relatively to the rotating disk.

7. In an apparatus of this character, the combination of a support, a continuously rotating disk carried thereby, two rings one made fast to the support and the other carried by the disk, the opposed faces of such rings being clutch faces, a sound record tablet support, a frame carried by the tablet support, a clutch member mounted in said frame for sliding movement, a sliding rod mounted in the first support and connected to said clutch member, and means for sliding the rod to actuate said clutch member relatively to the rings.

8. In an apparatus of this character, the combination of a support, a continuously

rotating disk mounted thereon and having a concentric chamber open through the top, two rings, one made fast to the support and the other carried by the disk, both of said rings being within the chamber and the opposed faces of such rings being provided with teeth, a sound record tablet support, a sliding rod mounted in the first support and operably connected to the tablet support, a pawl connected to said rod for engaging the teeth of the respective rings, and means for sliding the rod to actuate the pawl.

9. In an apparatus of this character, the combination of a support, a continuously rotating disk mounted thereon, and having a concentric chamber open through the top, two rings, one made fast to the support and the other carried by the disk, both of said rings being within the concentric chamber and the opposed faces of such rings being provided with teeth, a sound record tablet support, a frame carried by the tablet support and projecting into said chamber, a pawl mounted in said frame for sliding movement, a sliding rod mounted in the first support and connected to said pawl, and means for sliding the rod to move the pawl into engagement with either one of the rings at a time.

10. In an apparatus of this character, the combination of a support, a continuously rotating disk mounted upon the support and having a chamber therein, two rings, one connected to the disk within the chamber and the other connected to the support and also in the chamber, the latter being stationary, the opposed faces of the rings being provided with teeth, a sound record tablet support, a rod slidably mounted in the first support and operably connected to the tablet support, means carried by the rod for engaging the teeth of one of the rings at a time, and means for actuating the rod.

11. In an apparatus of this character, the combination of a support, a continuously rotating disk having a concentric chamber therein, two rings, one connected to the disk within the chamber and the other connected to the support within the chamber, the latter being stationary, the opposed faces of the rings being provided with teeth, a sound record tablet support, a frame carried by the tablet support, a pawl mounted in the frame and having its terminals disposed to engage the teeth of the rings, a rod slidably mounted in the first support and connected to the pawl, and means for actuating the rod to cause the pawl to engage one of the rings at a time.

12. A sound reproducing mechanism, including a support, a tubular shaft carried thereby, a disk having a tubular portion and a concentric recess surrounding the tubular

shaft for rotation, driving means connected thereto, a pair of oppositely disposed transmission means mounted within the recess of the disk, one being connected to the disk and the other being fast to the tubular shaft, and selectively operated means mounted in the shaft and disposed within the recess for sliding movement, whereby either one of the transmission means is engaged at a time.

13. A sound reproducing mechanism, including a support, a tubular shaft carried thereby, a disk having a tubular portion and a concentric recess surrounding the tubular shaft for rotation, driving means connected thereto, a pair of oppositely disposed transmission means mounted within the recess of the disk, one being connected to the disk and the other being fast to the tubular shaft, selectively operated means mounted in the shaft and disposed within the recess for sliding movement, whereby either one of the transmission means is engaged at a time, a sound record platform disposed above the disk for independent rotation, and means connected thereto and to the selective means, whereby the platform is held inert or rotated with the disk.

14. A sound reproducing machine, including a support, a fixed tubular shaft carried thereby, a momentum disk having a central recess and a tubular portion, said tubular portion being mounted for rotation upon the shaft, driving means connected to the tubular portion, two oppositely disposed ratchet wheels mounted within the recess, one of said wheels being fast to the fixed shaft and the other being fast to the disk, a tablet support mounted above the disk, a connecting member attached to the tablet support and projected within the recess of the disk, a longitudinally movable and rotative shaft mounted in the tubular shaft and projecting above and below the same, and means mounted upon the upper end of said last shaft and operably connected to the attaching member of the tablet support for establishing connection with either one of the ratchet wheels, whereby the tablet support is held inert when engaging the fixed ratchet wheel or is rotated with the momentum disk when engaging the other ratchet wheel.

In testimony whereof I affix my signature.

CHARLES W. EBELING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

UNITED STATES PATENT OFFICE.

JONAS W. AYLSWORTH, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SOUND-RECORD.

1,255,500.

Specification of Letters Patent.

Patented Feb. 5, 1918.

No Drawing. Original application filed February 11, 1910, Serial No. 543,236. Divided and this application filed May 24, 1915. Serial No. 30,197.

To all whom it may concern:

Be it known that I, JONAS W. AYLSWORTH, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Sound-Records, of which the following is a description.

My invention relates to sound records formed of refractory condensation products, this application being a division of my copending application Serial No. 543,236, which has matured into United States Patent No. 1,146,388, dated July 13, 1915, this application being also a continuation in part of my copending application Serial No. 499,103, which has matured into United States Patent No. 1,146,386, dated July 13, 1915, as to the matter common to this application and said application Serial No. 499,103.

My object is to produce records of improved quality, life, and other valuable characteristics from substances of the class described.

The materials from which I manufacture the sound records are in their final state non-fusible, insoluble and difficult to mold by processes requiring the material to be cast or pressed while in a plastic state. The materials referred to are condensation products of phenol or equivalent substances, and formaldehyde or other material containing active methylene groups. It has been proposed to carry the reaction of such substances to an intermediate state only and to harden the same in a mold in which they are shaped to the final, refractory and infusible condition. The hardening reaction of such intermediate phenolic condensation products and other condensation reactions of similar character require a considerable time even when a relatively high temperature is employed, resulting in the necessity of employing expensive matrices in large numbers in order that the required output of a given sound record may be obtained, and which accordingly, curtails the number of facsimiles which may be made from each matrix per diem.

My invention greatly increases the number of records which may be made from each matrix per day, and also obviates another objectionable feature incident to the

manufacture of sound records molded from condensation products wherein the reaction is caused to culminate entirely or in part, while the product is inclosed in the matrix under the influence of heat and pressure, which consists in the entrapping of by-products of the reaction within the intermolecular spaces of the product. These by-products may consist of water vapor, vapor of ammonia, excess of formaldehyde or other material containing the methylene radical, etc., according to the specific character of the composition employed. These gaseous products even though they may be small in amount, impair the surface of the record to an extent causing a phonetic roughness, and otherwise impair the quality of a high grade record.

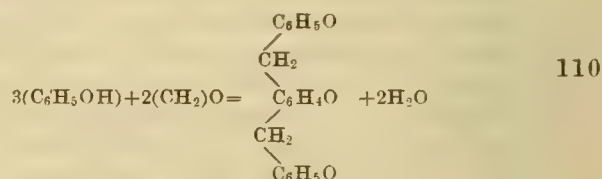
My invention relates specifically to disk records of either the vertical or transverse groove type, although it is obvious that the same methods may be used in connection with the cylindrical type of record. My invention comprises broadly a sound record as a new article of manufacture composed of the ingredients hereinafter to be described, which record may broadly be of either the disk or cylindrical type; my invention also comprises specifically a disk sound record formed in the manner and by the specific process to be described.

The process of manufacturing disk records involves four principal steps or operations. The first step consists in the preparation of the composition in such a manner that the components thereof may react chemically or harden to form a hard infusible product when subsequently heated to the proper reacting temperature. The second step consists in heating the composition to the desired form in a blank mold heated only sufficiently to render the composition plastic, so that it may be compressed to fill the mold and weld the mass to a solid unit of the desired shape. This blank has not so far been given its final hardening. The third step consists in removing the blank so formed from the mold, heating it in a suitable receptacle for the purpose of hardening or completing the reaction, and permitting the by-products of the reaction to evaporate or escape from the blank. The fourth step consists in pressing the hardened blank in a hot matrix to form the desired sound

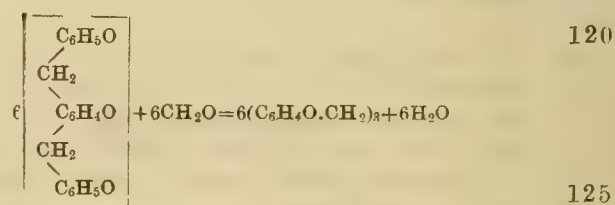
record. The material which I use for forming blanks and subsequently records therefrom, is of such a character that in its final condition it is refractory, infusible, and insoluble, but is rendered sufficiently plastic by application of a suitable amount of heat to take a perfect impression from the mold. Final condensation products of phenol and formaldehyde or other methylene-containing agents can usually not be rendered sufficiently plastic by the action of heat to take an impression from a mold or die, but my improved composition has this characteristic because of the inclusion therein of an element of the class which I denote as final product solvent elements, as disclosed in my United States Patent No. 1,102,630, dated July 7, 1914.

It may be well to state that it is now well known that phenolic bodies may be caused to react when combined with formaldehyde or polymers thereof to form condensation products of various degrees of hardness and infusibility. One type of these products are fusible resinous products which are known by the general name of shellac substitutes. These are soluble in various solvents, may be melted, and are suitable generally for use as substitutes for shellac and similar uses. The other type of reaction products referred to is a hard infusible insoluble amorphous mass which is chemically inert. A great practical difficulty in the use of the last named product has been that when the reaction has been carried on at sufficiently high temperatures and with sufficient energy to enable the product to be formed within a reasonably short time, gases of dissociation of formaldehyde or the like have been evolved, together with water vapors, which have rendered the mass porous and consequently unfit for most industrial applications. It has been proposed to hasten the reaction by the use of catalytic or so-called condensing agents in small quantity, which, however, leave objectionable components in the mass or traces thereof, result in the evolution of gas, and aid in the setting up of internal stresses within the substance, which render it brittle and distorted and shorten the life and usefulness of the product. It has also been proposed to perform the final reaction in such substances under counteracting pressure, which prevents in large measure, the formation of objectionable bubbles and porosity, this process being similar to the well known method of vulcanizing rubber and the employment of pressure in the manufacture of other industrial compositions. The use of such pressure results in the entrapping of water vapors and other gases within the substance in the manner described in my United States Patent No. 1,020,593, dated March 19, 1912. This result necessarily takes place if the

counteracting pressure is greater than the pressure of the water vapor or other gases, as it must be to prevent the escape of such gases during the reaction. In my United States Patent No. 1,102,630 above referred to, I describe a final phenolic condensation product and a method of preparing the same in which catalytic agents are not required, and in which the use of a counteracting pressure during the final reaction is not necessary. This result is attained by the formation, first, of a final or permanently fusible primary reaction product in which the formaldehyde or methylene-containing element is all combined with the phenol, and the phenol is all or practically all combined with the aldehyde. A hardening reaction is then caused to take place between this product and formaldehyde or a polymer thereof in quantity just sufficient to combine with all of the fusible condensation product to form the final hard condensation product, the methylene-containing or hardening ingredient being used in relatively small quantities and the heat of the reaction being regulated to prevent the escape of formaldehyde gas during the reaction. It was my discovery that formaldehyde or other methylene-containing agent and a phenolic body may be combined and caused to react in such proportions that the fusible condensation product referred to is formed, and this substance may then be combined with a further amount of formaldehyde or other methylene-containing ingredient to form the final condensation product. The proportions required for the formation of the fusible product referred to in order to get the best results are three parts of phenol to two parts of formaldehyde by molecular weight. This apparently causes the chemical reaction

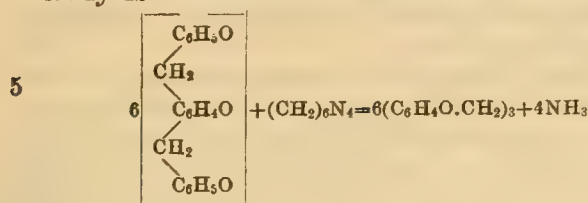


The final hardening reaction when paraform or other anhydrous form of formaldehyde is used apparently causes the chemical reaction



when the paraform is used in suitable quantity. When hexa-methylene-tetra-amin is used in place of the paraform, as described in United States Patent No. 1,020,593 above

referred to, the chemical reaction apparently is



The product formed by either reaction hardens on the application of a suitable amount of heat to an infusible refractory resinous amorphous mass of a pale amber color when the reacting substances are pure. Subsequent to the date of my invention embodied in U. S. Patent No. 1,102,630 above referred to, I discovered that a substance containing a methylene radical other than the oxid or hydroxid and preferably hexamethylene-amin or hexa-methylene-tetra-amin, as it is sometimes called $(\text{CH}_2)_6\text{N}_4$, or other methylene-amin compound, might be substituted for the paraform or other aldehyde element used in the final reaction for hardening the substance with improved effect. This discovery is embodied in my United States Patent No. 1,020,593 referred to. The hexa-methylene-amin or other methylene-amin compound possesses the chief advantage over the aldehyde to perform the desired function in that it is not necessary to take great care to limit the amount of the methylene-amin to the exact proportion necessary for combining with the fusible condensation product, since gas is not evolved during the reaction if the methylene-amin is present in excess, the methylene-amin only parting with its methylene upon reaction with the fusible condensation product in exchange for hydrogen from the fusible product, which unites with the nitrogen of the methylene-amin to form ammonia. My improved phonograph record is formed from the substances described in the applications referred to and takes advantage of the discoveries therein recited.

While the use of the specific fusible product referred to is preferable, I may use various of the so-called shellac substitutes on the market for combination with the methylene-containing ingredient to form the final product with good results. So far as I know, no one prior to my discoveries above referred to, formed a final condensation phenolic product by first forming a permanently fusible product and adding thereto an ingredient which upon further heat treatment resulted in a final infusible condensation product, nor was the nature of the substances referred to accurately known. The general practice was to mix together in the first place all the ingredients necessary for the formation of the final infusible product, and to heat the same either in one or several stages to produce the final product. This re-

sulted in the formation of a product which at all stages prior to the formation of the final product contained free or uncombined formaldehyde or methylene-containing element, which, at the heat of the main reaction tended constantly to escape as gas. Other advantages of this method of procedure over the former method referred to and of the product so formed over the products previously known of the class described, are fully set forth in my patents referred to above.

The first step noted above in the formation of my improved sound record comprises the mixing together of a completed fusible soluble condensation product, such as certain shellac substitutes of phenolic origin, or the phenol resin referred to above and fully described in my patents above referred to, together with the following substances:—A final product solvent element or plasticity component; a methylene-containing agent or substance which will yield the methylene radical in exchange for an equivalent amount of hydrogen from the phenolic resin; a suitable filling component, such as inert powdered materials of mineral or organic nature. Each of these components is present in proper proportion to form a completed product of desired color, hardness and texture, when submitted to the subsequent operations.

Examples of compositions of the class specified are the following:—

Phenol resin or equivalent shellac substitute—100 parts by weight. 100

Solid solvent or plasticity component such as

Meta-di-nitro-benzole.....	} 10 to 20 parts	105
Nitro-naphthalene		
Camphor		
Stearic amid or other solid acid amids of the acetic series		

Methylene yielding agent such as 110

Hexa-methylene-amin.....	} 7 to 11 parts
Tri-oxy-methylene	
Thio-formic aldehyde	

Pigment such as lamp black—2 to 5 parts

Mineral filling agent such as 115

Plaster of Paris.....	} 50 to 300 parts	120
Barium sulfate		
Infusorial earth.....		
Clay, etc		

or as an alternative, an organic filling agent such as

Powdered amber.....	} 50 to 100 parts	125
Wood flour.....		
Ivory nut dust.....		
Insoluble casein salts.....		
Infusible resins.....		
Infusible condensation products in powdered form.....		

130

Of the above named solid solvents or plasticity components, meta-di-nitro-benzol and nitro-naphthalene are preferred because they are neither volatile nor water soluble.

5 The equivalents of these components could, of course, also be used.

The composition may be mixed by powerful kneading machines or ground or rolled at temperatures below the reaction temperature which, for the above type of composition, is about 180 degrees F. The mixed material may be pulverized or may be formed in rough cakes suitable for compressing or consolidating in subsequent molding operations.

10 The second step comprises the consolidation of the powdered substances or compression of the rough cake into a suitable heated blank mold by hydraulic or other pressure and the removal of the blank from the mold, which may be accomplished without cooling when some compositions are used, while with others it is necessary to first cool the mass.

25 The third step comprises heating the blanks to a proper reaction temperature for a sufficient time to allow the complete hardening reaction to take place and drying out or expelling the undesirable reaction products previously mentioned. During this operation, the blank may be supported in such a manner that it will lie flat and that the reaction byproducts may escape readily. It is obvious that as much time as is required may be used in this operation, even though it takes several hours or even days, without injurious consequences, since no expensive molds are involved and caused to remain idle during this step of the process. When the blanks are hardened in finished condition, they may be stored for indefinite periods preparatory to use in the fourth step of the process, consisting in pressing the blanks to make sound records from suitable matrices, or they may be taken at once from the oven while still hot and placed in the record matrix, which is also heated to the proper temperature for rendering the particular composition used sufficiently plastic to take the impression of the sound waves from the matrix. This fourth step is carried out by means of hydraulic presses, and the matrices are cooled in the presses, this operation requiring the use of the mold but a few moments.

Records thus made have no tendency to stick to the mold, which is often the result when the final reaction is caused to take place within the mold. Furthermore, the records may be repressed if desired to make them over when obsolete. Furthermore, there is no tendency for the filling material in the composition to injure or wear the matrix or for the components of the composition to corrode the matrix when the com-

position is made as described in contra-distinction to similar records made when the operation is carried on by heat and pressure within the matrix.

When cylindrical sound records are to be made in accordance with my invention, the ingredients are prepared, mixed and consolidated to shape in a blank cylindrical mold, the mold being heated and pressure applied in any desirable manner to mold the blank. Preferably, the heat employed is of a temperature less than the reaction temperature of the composition. The blank is then cooled and upon shrinking sufficiently is removed from the blank mold by direct longitudinal movement thereof. It is then heated in an oven or other suitable receptacle sufficiently to permit the hardening reaction to take place and the harmful reaction by-products to escape in the manner referred to in connection with the process as applied to disk records. The blanks thus formed are pressed in a suitable cylindrical matrix to form the sound record on their outer surfaces, while the blanks are in plastic condition, the blanks either being put into the molds directly from the oven while still hot, or if they are stored for future use, they may be heated sufficiently to become plastic before being placed in the sound record matrix. The pressure may be applied upon the blanks to form the record in any suitable manner, and the records thus formed are cooled sufficiently to shrink away from the record surface, when they may be removed from the mold, or they may be removed by means of suction applied to the interior of the record or pressure applied to the outer surface of the record, or both, as disclosed in my United States Patent No. 1,036,416, dated August 20, 1912.

While I consider it preferable to form sound records and blanks by the processes described, it should be understood that my invention comprises broadly sound records and blanks formed of the substances described by any suitable process, such records being, to the best of my knowledge, novel articles of manufacture however formed. Thus, while I prefer to form sound records by the processes described, in which the record is formed upon the blank by pressing, it is possible to form records of the substances described by a casting operation,—that is to say, by carrying on all the necessary reactions to form the final article within the mold itself. It also should be understood that any water vapor contained within the mass may be absorbed by a suitable percentage of a water-absorbing element, as described in my U. S. Patent No. 1,102,630, and that if a methylene-amin compound is used as a hardening agent, as described in my U. S. Patent No. 1,020,593 above referred to, the ammonia evolved may be fixed

by the addition of a small percentage of an ammonia fixing agent to the mass, such as one of the anhydrides of the higher members of the acids of the acetic series, or phthalic or benzoic anhydrid, which results in the formation of an acid amid, which substance has the desirable properties of acting as a final product solvent agent or plasticity or water-combining agent, as well as an ammonia fixing agent.

The sound record formed by any of the processes described above is exceedingly hard and is exceptionally well adapted to give a sound reproduction of excellent quality when played. I have found that the yielding by elasticity of the record surface when tracked by a small reproducing stylus point is very pronounced with all of the well known hard wax or metallic soap compositions, and results in a weaker reproduction than would otherwise be the case. The volume of sound and clearness of definition on reproduction increases directly with the hardness of the record substance, as indicated by any known method of measuring hardness. Accordingly, as stated, the composition of which I now propose to form sound records, because of its exceeding hardness, gives a greatly improved reproduction.

Having now described my invention, what I claim as new and desire to protect by Letters Patent of the United States is as follows:—

1. As a new article of manufacture, a sound record or blank containing a final infusible phenolic condensation product which is sufficiently plastic when heated to be pressed or molded, and an inert filling material incorporated with said product in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

2. As a new article of manufacture, a sound record or blank containing a final infusible phenolic condensation product which is sufficiently plastic when heated to be pressed or molded, and a fibrous filling material incorporated with said product in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

3. As a new article of manufacture, a sound record or blank containing a final infusible phenolic condensation product which is sufficiently plastic when heated to be pressed or molded, and a filler of wood flour incorporated with said product in the pro-

portion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

4. As a new article of manufacture, a sound record or blank containing an infusible phenolic condensation product and a filling material incorporated therewith in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

5. As a new article of manufacture, a sound record or blank containing an infusible phenolic condensation product and a filling material comprising wood fiber incorporated with said condensation product in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

6. As a new article of manufacture, a sound record or blank containing an infusible phenolic condensation product and a finely divided filling material in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

7. As a new article of manufacture, a sound record or blank containing an infusible phenolic condensation product which is sufficiently plastic when heated to be pressed or molded and a finely divided filling material in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

8. As a new article of manufacture, a sound record or blank containing an infusible phenolic condensation product of a phenol resin and a methylene containing compound or derivative and a finely divided filling material in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

9. As a new article of manufacture, a sound record or blank containing an infusible phenolic condensation product of a phenol resin and a methylene containing compound or derivative and containing no catalytic agents or free or combined water and a finely divided filling material in the proportion of at least 50 parts of filling material to 100 parts of condensation product, substantially as described.

This specification signed and witnessed this 21st day of May, 1915.

JONAS W. AYLSWORTH.

Witnesses:

FREDERICK BACHMANN,
J. UNGER.

AUTOMATIC STOP ADJUSTER.

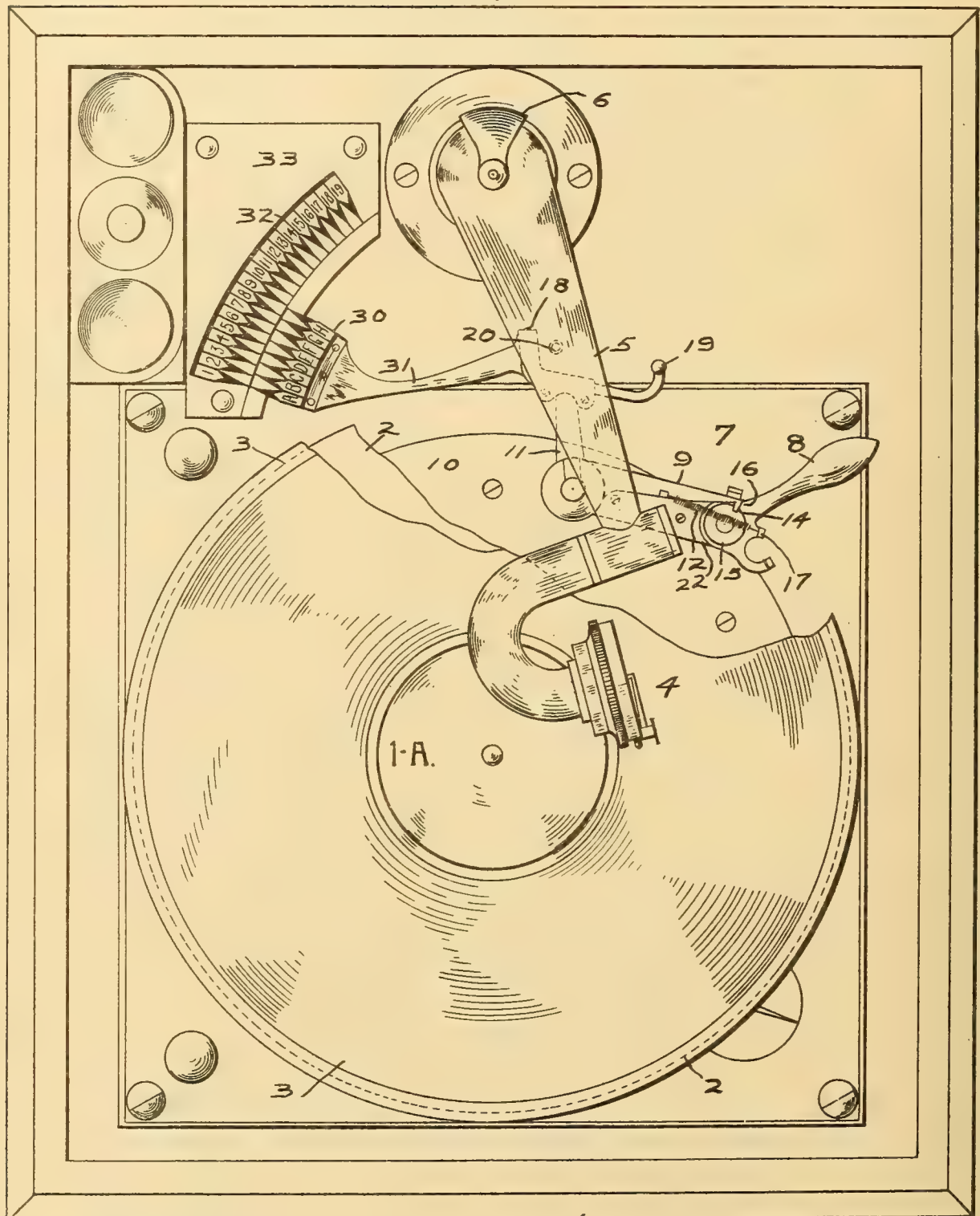
1,255,564 ----- O. H. Paddock,
Patented Feb. 5, 1918,
Filed Aug. 27, 1914.

1,255,564.

O. H. PADDOCK.
AUTOMATIC STOP ADJUSTER,
APPLICATION FILED AUG. 27, 1914.

Patented Feb. 5, 1918.
2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

R. G. Allen
F. E. Aub.

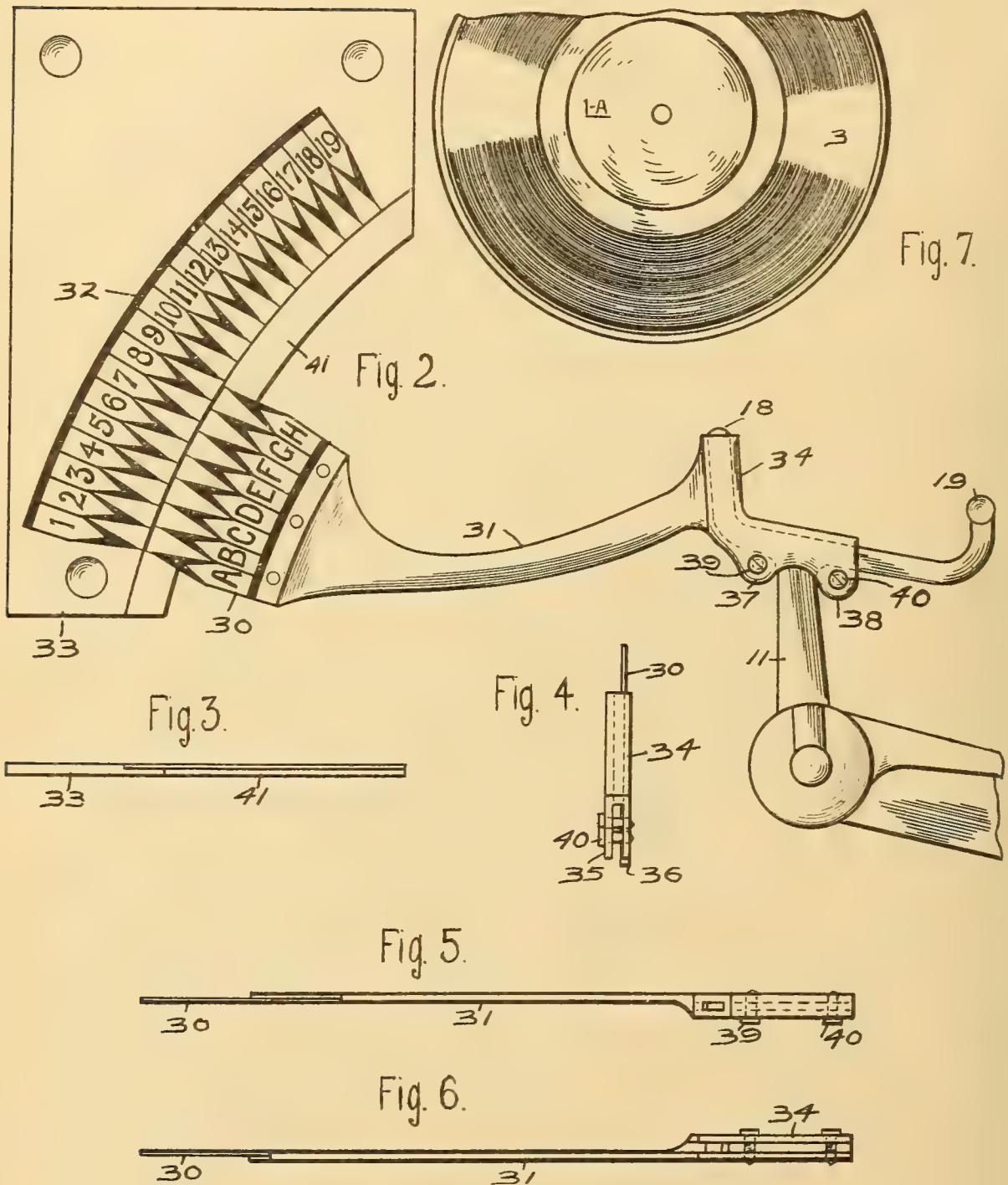
INVENTOR

Ormond H. Paddock
by
Owen, Owen & Crawford

O. H. PADDOCK.
 AUTOMATIC STOP ADJUSTER.
 APPLICATION FILED AUG. 27, 1914.

1,255,564.

Patented Feb. 5, 1918.
 2 SHEETS—SHEET 2.



WITNESSES
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UNITED STATES PATENT OFFICE.

ORMOND H. PADDOCK, OF TOLEDO, OHIO.

AUTOMATIC STOP-ADJUSTER.

1,255,564.

Specification of Letters Patent.

Patented Feb. 5, 1918.

Application filed August 27, 1914. Serial No. 858,872.

To all whom it may concern:

Be it known that I, ORMOND H. PADDOCK, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Automatic Stop-Adjuster; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to automatic stop adjusters for causing rotatable tables of phonic reproducing instruments to stop at the terminus of the records carried thereby. The invention is particularly applicable to phonographic instruments to cause the instruments to discontinue when the reproducing needle has reached a certain point in its translation over the record. The invention is applicable to the well known form of disk records and it is with its modifications applicable to the well known cylindrical records.

The object of the invention is to provide a means which will locate an automatic stop so that it will be brought into operation when the reproducing needle has completed its travel over the record.

The invention may be contained in many forms of constructions usable for different purposes, all of which come within the purview of my claim hereinafter appended. To show the practicability of my invention, I have selected one of such constructions as an example and shall describe it hereinafter. The construction selected is illustrated in the accompanying drawings.

Figure 1 illustrates a top view of a phonographic instrument such as the well known Victrola, having attached thereto one of the forms of the automatic stop adjusters which embody my invention. Fig. 2 is a top view of the adjuster. Fig. 3 is a side view of the coacting indicating means. Fig. 4 is an end view and Figs. 5 and 6 are opposite edge views of the adjuster. Fig. 7 illustrates a record plate of the type well known in the art.

Referring to Fig. 1, 1 is the top of the

casing containing the operative mechanism for driving the plate 2 and the record disk 3. 4 is the reproducer supported on the acoustic arm 5 which is rotatably mounted by means of the bracket 6 on the top of the casing 1. I have shown the invention as applied to the well known Victrola stop mechanism 7 having the arm 8 pivoted on the frame or bracket 22 which is secured to the plate 10 which is secured in the top of the casing 1. The arm 9 is frictionally connected to the arm 11 and is also pivoted on the same axis therewith. The arm 8 freely moves on its pivotal connection. A spring 12 connects the arms 8 and 9, the points of connection being in a line passing very near the axis of the pivot of the arm 8 which yieldingly draws the arm 8 counter-clockwise and at the same time yieldingly draws the arm 9 clockwise. A recess 14 is formed in a boss 15. The arm 9 is provided with a lug 16 adapted to enter the recess 14 and lock the arm 8 in position against the operation of the spring 12 when the arm 8 is turned clockwise. The arm 8 is provided with a finger 17 which is adapted to frictionally engage with a flange or rim located on the table 2 when the arm 8 is released from the engaging lug 16. The spring 12 then causes the arm 8 and the finger 17 to rotate counter-clockwise until the finger 17 frictionally engages with the rim of the plate in the manner well known in the art. The arm 11 is provided with fingers 18 and 19 and the acoustic tube 5 is provided with a downwardly extending pin 20 which may engage with the finger 18 of the arm 11 when the reproducer 4 is carried inward as it follows the phonic groove produced in the record plate. If the finger 18 is placed in position so that the pin 20 will move the arm 11 counter-clockwise, the arm 11, which is frictionally connected with the arm 9, will move the arm 9 to cause disengagement between the lug 16 and the arm 8, whereupon the arm 8 will rotate counter-clockwise by the action of the spring 12 and cause the finger 17 to frictionally engage with the rotating table 2 and cause it to stop. The arm 11 may be placed in position such that it will be engaged by the pin 20 when the reproducer registers with the end of the record by movement of the finger 19. The arm

11 is placed in such position by placing the reproducer on the inner circular line of the record and holding the reproducer in position while the finger 19 is operated to pull the arm 11 in position such that the finger 18 will be pressed against the pin 20. The reproducer is then lifted and the acoustic hollow arm 5 together with the reproducer is swung about the pivot of the acoustic arm 5 so as to bring the reproducer to near the periphery of the record disk where the reproducer may be placed in the outer circular groove of the record. The arm 8 is then rotated clockwise to release the table top, whereupon the table top will begin to rotate if connected with a source of power such as a wound spring, and the reproducer will reproduce the record. As the reproducer travels along the groove of the record it is moved toward the axis of the plate 2. When it arrives at the inner spiral line of the groove, the pin 20 will engage with the finger 18 and cause the arm 9 to disengage with the arm 8 which permits the spring 12 to cause the table to stop in the manner well known in the art.

It has been found in the operation of this construction that it is exceedingly difficult to set the automatic stop. It is difficult to place the reproducing needle on the inner spiral line of the record. The needle is so located with respect to the reproducer and the lines are so close together and indistinct that it renders it difficult to locate the needle at the end of the record. By my invention a means is provided for adjusting the position of the finger 18 so as to be engaged by the pin 20 at the end of the reproduction of the record. This may be accomplished by a fixed scale and a movable pointer or by a reverse structure having a movable scale and a fixed pointer so placed as to indicate the position of the arm 11. It may also be accomplished more efficiently and the refinements of the scale avoided by means of a fixed scale secured to the frame of the machine and a movable scale attached to the arm 11 there being a scale differential between any given number of the divisions of one of the scales relative to the divisions of the other. In the construction shown a scale 30 is supported on an arm 31 which is connected to the arm 11 and a fixed scale 32 is supported on a suitable plate 33 which may be attached to the top of the casing 1. Seven of the divisions of the scale 30 are a little less than eight of the divisions of the scale 32. The dividing points of the scale 30 are indicated preferably by the letters of the alphabet while the leading points of the scale 32 are indicated by numerals. The scale points are indicated in any suitable way. I have shown sharp arrow heads which point to the division points of the scales which greatly assist in determining when the scale points coincide.

The records may be marked with the scale markings such as 1—A or 7—D and the automatic stop may be easily adjusted accordingly. The difficult operation of hunting the terminus of the record and holding the reproducer, which injures the record, at the point of the penetration of the needle in the record, while the finger 18 is brought into contact with the pin 20 and then subsequently swinging the arm 5 and reproducer 4 to near the periphery of the record disk 3, keeping in mind the necessity of lifting the reproducer from the record disk to avoid destruction of the record which would be caused by dragging the needle of the reproducer over the record, is avoided. By my invention all that is required is to place the two points indicated on the plate together such as the point "A" on the scale 30 in register with the point 1 on the scale 32 and start the reproduction.

The arm 31 may be frictionally connected directly with the arm 9 or it may be attached to the arm 11 in any suitable way. In the form of the invention illustrated, I have provided a channeled L-member 34 which may be slipped over the finger 18. The turn of the channel may be provided with two lips 35 and 36 which extend over portions of the fingers 18 and 19. The member may be provided with two ears 37 and 38 and screws 39 and 40 may be inserted through the ears 37 and 38. They will extend through the channeled member on opposite sides of the arm 11 and operate to clamp the member to the arm 11.

The arm 31 may be made of aluminum or any other suitable light weight material and the scale 30 may be made of any suitable sheet material on which the divisions and indications may be printed, and pressed or otherwise represented. Also the scale 32 may be fixed in any suitable way upon the plate 33. The plate 33 may be formed with a depressed edge 41 so as to bring the surfaces of the two scales substantially in the same plane to further assist in the location of the points indicated on the record for placing the stop mechanism by the operation of the arm 31.

The construction selected and described, may be greatly varied in the arrangement and manufacture of its parts and in the substitution of elements having equivalent functions and such modifications may be used for many varied purposes and still contain the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is,—

In a stop mechanism of a phonographic machine, the combination of a stationary arcuate scale having sharp arrow-headed division points, a relatively short Vernier scale having sharp arrow-headed division

points, a rotatable arm for supporting the Vernier scale and moving the scale division points along the line of the division points of the first named scale, numerals located in
5 the bases of the arrow heads of one scale, and letters located in the bases of the other scale.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

ORMOND H. PADDOCK.

Witnesses:

E. E. THOMAS,

F. E. AUL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

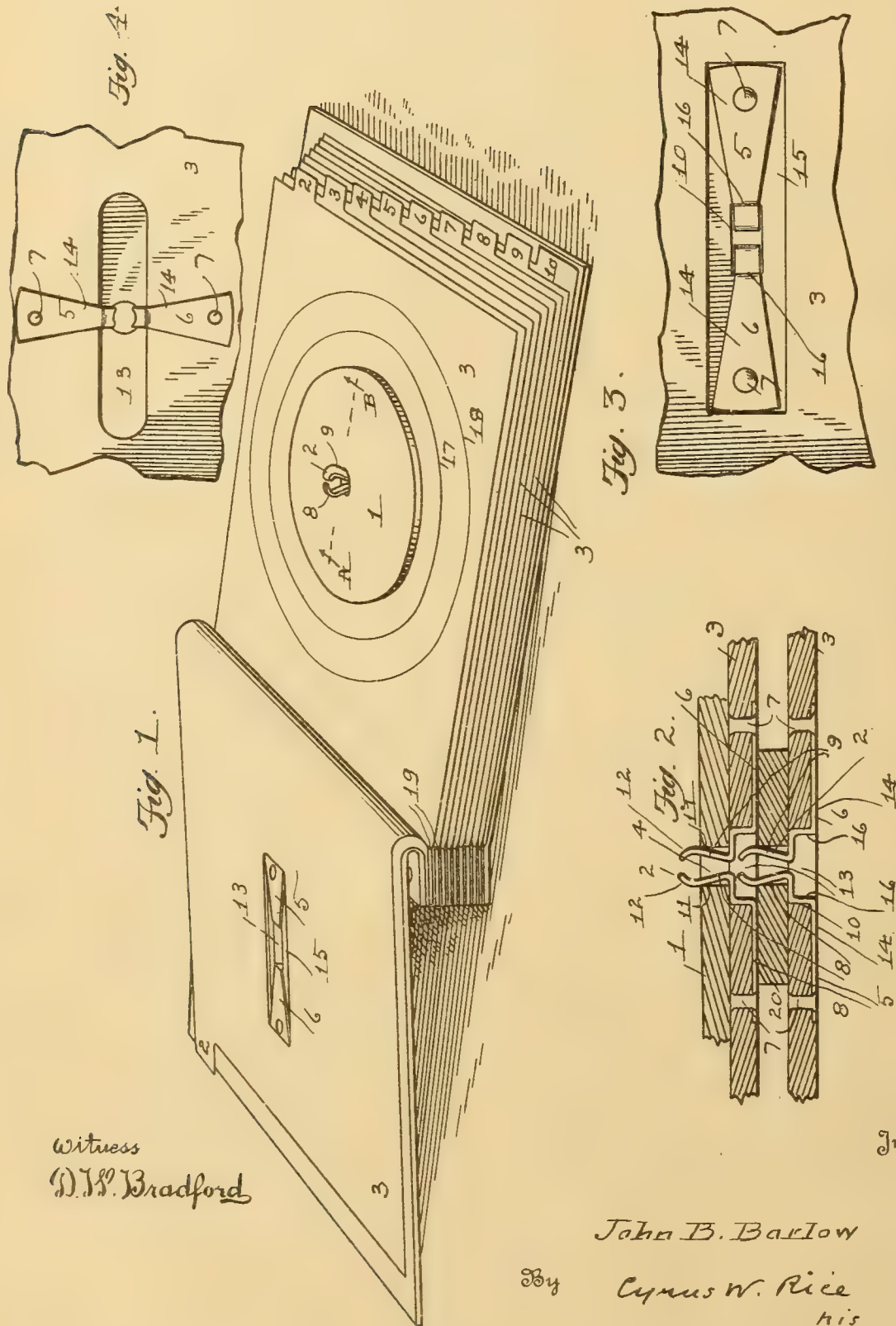
HOLDER FOR PHONOGRAPH RECORDS.

1,255,690 ----- J. B. Barlow,
Patented Feb. 5, 1918,
Filed Mar. 15, 1917.

J. B. BARLOW.
 HOLDER FOR PHONOGRAPH RECORDS.
 APPLICATION FILED MAR. 15, 1917

1,255,690.

Patented Feb. 5, 1918.



Witness
 D. W. Bradford

Inventor

John B. Barlow

By Cyrus W. Rice

his Attorney

UNITED STATES PATENT OFFICE.

JOHN B. BARLOW, OF WALKER TOWNSHIP, MICHIGAN.

HOLDER FOR PHONOGRAPH-RECORDS.

1,255,690.

Specification of Letters Patent.

Patented Feb. 5, 1918.

Application filed March 15, 1917. Serial No. 155,062.

To all whom it may concern:

Be it known that I, JOHN B. BARLOW, a citizen of the United States, residing in Walker township, in the county of Kent and State of Michigan, have invented new and useful Improvements in Holders for Phonograph-Records, of which the following is a specification.

The present invention relates to holders for phonograph records; and its object is to provide a simple device of that character wherein such records may be securely kept; and further, such a device whose bound leaves may be kept in alinement.

These objects are attained by, and the invention finds preferable embodiment in, the structure hereinafter described and illustrated by the accompanying drawings, in which:—

Figure 1 is a view in perspective of a phonograph record holder, opened;

Fig. 2 is a sectional view of part of the same taken on a plane corresponding to line A—B of Fig. 1 and enlarged;

Fig. 3 is a bottom plan view of part of one of the bases or leaves, and enlarged; and

Fig. 4 is like view of a modified construction.

The phonograph records 1 are removably held in the holder by studs 2 carried by and projecting from the faces of the bases or leaves 3. These studs are adapted to enter the central orifices 4 of the records, thus to retain them in position. Preferably these studs are laterally compressible and elastic so as to yieldingly fit in and engage the sides of said orifices. This effect is attained in the preferable construction shown, by forming the studs of oppositely disposed halves or members 5, 6, of spring metal and secured as by rivets 7 to the under side of the bases or leaves, and having portions 8, 9, extending through openings 10 in the bases to which they are secured, and thence upwardly through the records' orifices. In this construction the outer sides of the spring members diverge correlatively, outwardly from the base, as particularly shown at 11 in Fig. 2, so that by removing the record from such members, they must be pressed toward each other; the outer sides of these members then converge, as particularly shown at 12 in said figure, so that the records' orifice may be readily passed over and around the extremities of the members and pressed down on the base.

The bases may be bound together as leaves in a book, as shown in Fig. 1.

In turning the leaves over there is necessarily some interrelative sliding movement toward and away from the binding edge of the leaves. On the under side of the leaves I provide slots 13 extending at right angles to the binding edge: in order to keep the leaves in alinement, and at the same time permit such sliding movement, the outer ends of the spring members extend above the record held thereby and into these slots in the adjacent leaf above, as particularly shown in Fig. 2.

The body portions 14 of the spring members may be seated in recesses 15 in the under sides of the leaves, as shown in Fig. 3, the space between their shoulders 16 defining the slot 13 aforesaid: or as shown in Fig. 4, these body portions may be positioned at right angles to the slot 13.

To assist in the ready placing of the stud in the record's orifice, (the stud being hid from view by the record itself) I provide on the face of the base or leaf certain markings arcuately disposed concentrically with the stud, as the circles 17, 18.

Filler pieces 19 should be provided between the leaves at their binding edge, and also other such pieces 20 adapted to detachably fit over the studs (to be removed when records take their place), all being the thickness of the records.

The leaves may have index tabs suitably numbered as shown, and the leaves may display printed or written matter descriptive of the records.

It will be seen that inasmuch as the spring members extend through the records, their diverging portions 11 also extending there-through, such diverging portions press obliquely on the record at the upper end of the orifice, so as to press the record downwardly on the base.

I claim:

1. In a device of the character described; a base; a stud carried by the base and adapted to enter the central orifice of a phonograph record and hold said record on the base; the base having a marking arcuately disposed concentrically with the stud.

2. In a device of the character described; a base having an opening therethrough; a stud comprising oppositely disposed spring members secured to the under side of the base and having portions extending through

said opening and adapted to enter the central orifice of a phonograph record on the upper side of the base and yieldingly engage said orifice's sides to hold said record on the base.

3. In a device of the character described; a plurality of leaves bound together at one edge, the leaves having slots extending at right angles to said edge; studs carried by the leaves and adapted to enter the central orifice of phonograph records to hold said records and extending beyond said record and into the slot in the adjacent leaf in the closed position of the leaves.

4. In a device of the character described;

a plurality of leaves bound together at one edge, the leaves having slots extending at right angles to said edge; studs comprising oppositely disposed spring members secured to the under sides of the leaves and having portions extending through the leaves to which they are thus secured and adapted to enter and extend through the central orifice of records and into the slot in the adjacent leaf on the opposite side of said record in the closed position of the leaves.

In testimony whereof I have hereunto set my hand at Grand Rapids, Michigan, March 12, 1917.

JOHN B. BARLOW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MECHANISM FOR CONTROLLING MOTION PICTURE AND
SOUND REPRODUCING MECHANISMS.

1,255,822 ----- H. W. Rogers,
Patented Feb. 5, 1918,
Filed Oct. 11, 1913.

H. W. ROGERS.

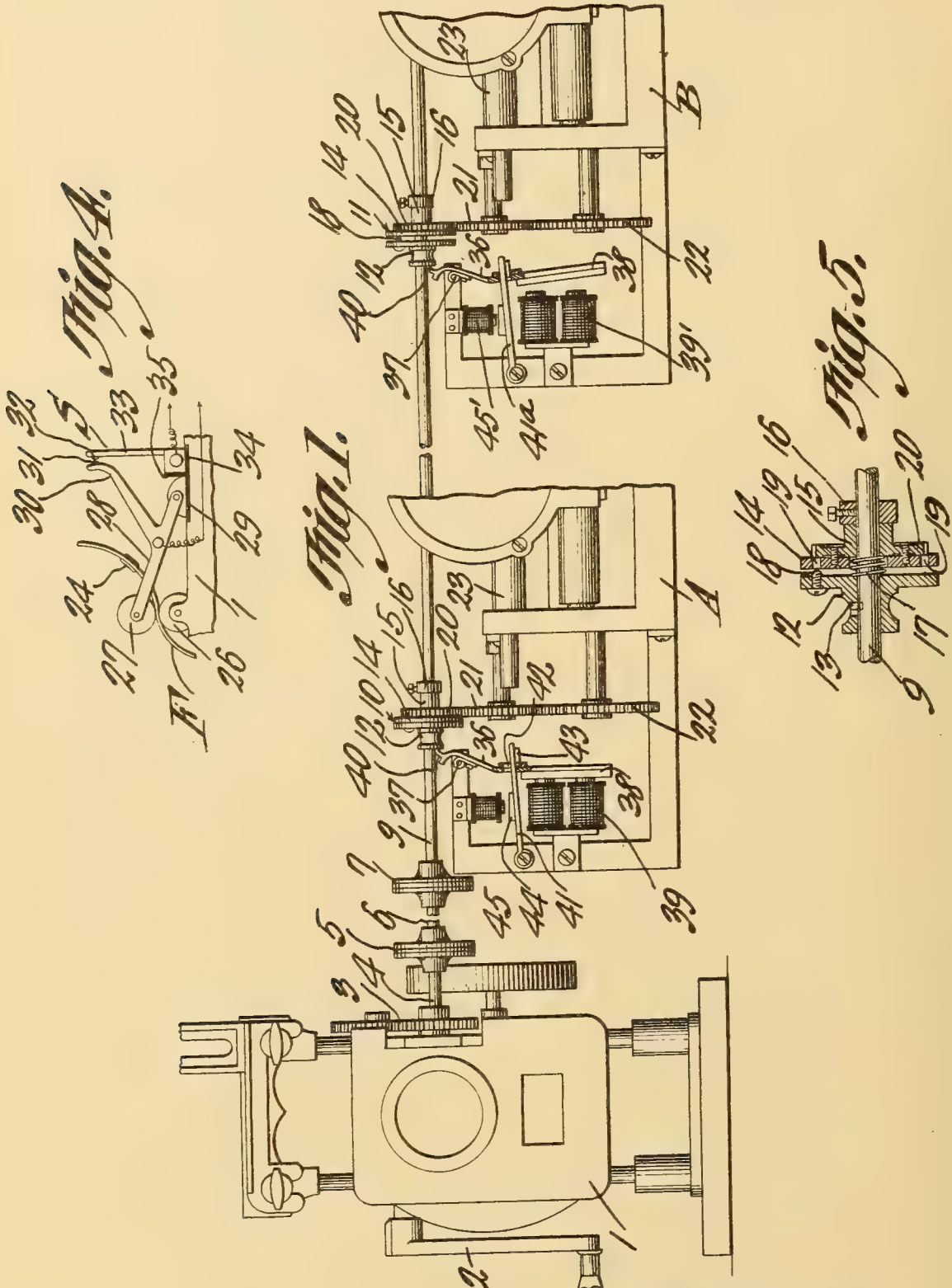
MECHANISM FOR CONTROLLING MOTION PICTURE AND SOUND REPRODUCING MECHANISMS.

APPLICATION FILED OCT. 11, 1913.

Patented Feb. 5, 1918.

2 SHEETS—SHEET 1.

1,255,822.



Witnesses

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S. A. Willson.

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Attorneys

H. W. ROGERS.

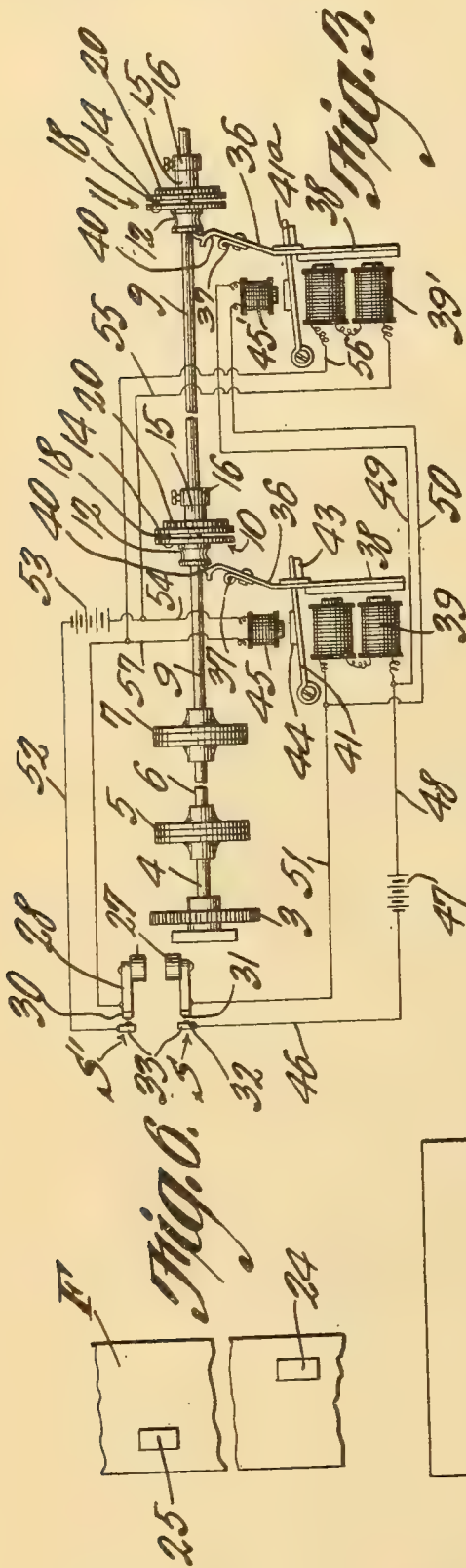
MECHANISM FOR CONTROLLING MOTION PICTURE AND SOUND REPRODUCING MECHANISMS.

APPLICATION FILED OCT. 11, 1913.

Patented Feb. 5, 1918.

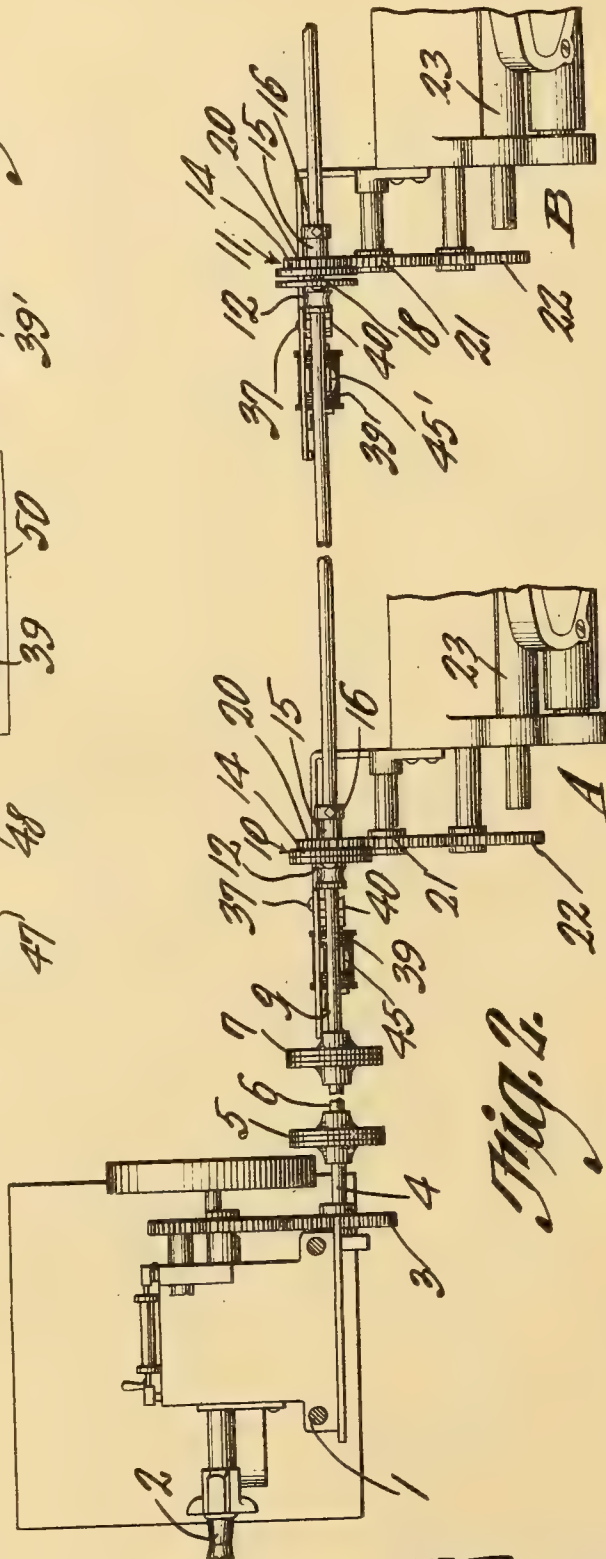
2 SHEETS—SHEET 2.

1,255,822.



Witnesses

J. P. Tomlin
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UNITED STATES PATENT OFFICE.

HARRISON W. ROGERS, OF WHEELING, WEST VIRGINIA.

MECHANISM FOR CONTROLLING MOTION-PICTURE AND SOUND-REPRODUCING MECHANISMS.

1,255,822.

Specification of Letters Patent.

Patented Feb. 5, 1918.

Application filed October 11, 1913. Serial No. 794,632.

To all whom it may concern:

Be it known that I, HARRISON W. ROGERS, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Mechanism for Controlling Motion-Picture and Sound-Reproducing Mechanisms, of which the following is a specification.

10 The present invention relates to improvements in a mechanism for controlling motion picture and sound reproducing mechanisms, whereby the projector mechanism is connected to the sound record carrier or carriers, through the instrumentality of the moving film, the present application being a continuation of my co-pending application filed February 7, 1913, Serial No. 746,890, one object of the present invention 20 being the provision of means, whereby a plurality of sound record carriers may be operated successively, the first record being started and stopped so that there is an alternate stopping and starting throughout the series of sound record carriers and thus permitting of the introduction of titles for the succeeding song, instrumental selection, or act.

Up to the present time, it has been impracticable to exhibit by the moving films, while the sound record was being operated, titles and announcements, for the reason that no provision has been made for halting the sound record carrier during the presentation of the title, or announcement, by the film, and further as a full film is usually of sufficient length to necessitate the employment or use of two or more sound records, and therefore permits the projection of means for illustrating in songs, several songs, it is desirable that such song or songs be announced by title. The present device is capable of performing these functions, there being provided means controlled by the film for connecting clutch members so that the sound record is rotated at the desired instant and after the presentation of a title upon the screen, through the film, such sound record being disconnected and halted, while the next succeeding title for the following sound record is presented, the second record and etc., being operably connected and disconnected from the projector similar to the first one. It is therefore one 55 intention of the present invention, to pro-

vide a means, whereby the film at the proper time actuates a means to operate and permit the locking of the clutch members in engaged position, there being an automatic lock for locking the clutch members in such position, and at the proper time to release the locking device to free the clutch members so that the sound record is brought to a stoppage, even though the film continued its movement to present the title and the next succeeding scene. 65

In putting the present invention into practice, it is desirable that the clutch mechanism and the releasing mechanism be electromagnetically controlled, and that each be individually operated through coöperating means carried by and disposed in the path of the film. 70

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention. 80

In the drawings—

Figure 1 is a front elevation of the projector mechanism of a motion picture machine, showing a means whereby two cylinder sound reproducing means are operably connected thereto, portions of said latter means being eliminated. 85 90

Fig. 2 is a top plan view of the parts illustrated in Fig. 1.

Fig. 3 is a diagrammatic view showing the electromagnets and the circuits by means of which the same are controlled to alternately start and stop successive sound record carriers. 95

Fig. 4 is an enlarged detail view of the film actuated switch for controlling the respective circuits. 100

Fig. 5 is an enlarged detail sectional view of one of the clutches used with the present invention.

Fig. 6 is a plan view of a portion of a film having two switch closure projections or buttons. 105

Referring to the drawings, the numeral 1 designates the main frame and mechanism carrying portion of the projector of a motion picture machine, having in the present 110

instance the manually operated handle 2, which in motor machines is displaced by the usual electric or other motor. The gearing 3 of the projector mechanism, is of any construction, the present projector being indicative of any form of projector now upon the market and to which the present invention is applicable. The shaft 4 is operably connected to the gearing 3 and through the coupling 5 is connected to the short shaft 6, a coupling 7 connecting such short shaft 6 to the main record carrier driving shaft 9. Thus it will be seen that the shaft 9 is continuously rotated during the operation of the projector mechanism.

In the present illustration, two sound record carrying means A and B are illustrated, both of these, as will presently appear, being adapted to be connected, one at a time, to be operated from the shaft 9. Mounted upon the shaft 9 adjacent each one of the record carriers, is a clutch and transmission device 10 and 11 respectively, and as both are constructed identically, the description of one will suffice for both.

This clutch is particularly shown in detail in Fig. 5, and includes the slidable clutch member 12, keyed as at 13 to the shaft 9 so as to rotate with the shaft, the coöperating clutch member 14 thereof being mounted upon the shaft 9 through the instrumentality of the freely rotatable sleeve 15 and the limiting collar 16. The spring 17 normally holds the clutch member 12 separated from the member 14 so that the projecting screw 18 of the member 12 is held out of engagement with one of the apertures 19 of the member 14. By this means, it will be seen that when the member 12 is moved toward the member 14, the pin 18 is introduced into one of the apertures 19 and consequently the clutch member 14 rotates with the member 12.

In order that the respective clutches 10 and 11 may properly operate the respective sound record carrying means A and B, each freely rotatable member 14 is provided with the gear 20, which as shown meshes with the gear 21 of its respective record carrier and thus through the gear 22, operates the mandrel 23 upon which is adapted to be connected a cylinder sound record (not shown).

Under normal conditions, as before stated, the respective clutch members are in the position as shown in Fig. 5, the spring 17 holding the member 12 out of engagement with the member 14, and therefore in order to operate the member 12 of the respective clutches 10 and 11 alternately, so as to connect, as for instance, the sound record carrying means A for synchronous operation with the film F and during the operation of the projector, it is preferable that an electrical means be provided and control it through the instrumentality of the film and

the switch device, as clearly shown in Fig. 4, and diagrammatically as shown in Fig. 3. As clearly shown in Fig. 3, two of these switch devices S and S' are employed, both of them being identical in construction, but being controlled by means of the buttons or projections 24 and 25, as clearly shown in Fig. 6, said projections or buttons being placed upon the film F at predetermined points, that is the point at which it is desirable to operate the respective switches S and S' to thus throw the clutch 10 and release the clutch 11, or vice versa.

Both switches as before stated, are constructed identically, as clearly shown in Fig. 4, so that the film F may be guided between the rollers 26 and 27. As the roller 27 is carried by the pivotally mounted frame 28 and is insulated at 29 from the frame of the projector, the arm 30 carrying the switch point 31 is moved so that the switch point 31 is placed in engagement with the switch point 32 of the stationary arm or contact 33. This arm or contact 33 is insulated from the frame 1 as at 34 and also from the member 28 as at 35, so that when the contacts 31 and 32 are disengaged, no current is flowing, and current only flows momentarily when the contacts are made due to the introduction of the projection 24 or 25 between its respective pair of rollers 26 and 27.

In order to provide a means whereby the sliding clutch members 12 of the respective clutches 10 and 11 may be operated automatically and in proper time, as is predetermined by the button or projection upon the film F, and thus automatically connects the selected record carrier with the projector mechanism, the end 40 of the lever 36 bears against the member 12, said lever being pivoted as shown at 37 so that the armature 38 will depend in attractive relation to the cores of the electromagnets 39—39' respectively, the same being constructed and arranged, as clearly shown in Fig. 1 of the drawings. Thus when either one of the respective electromagnets 39—39' is energized, the armature 38 will be attracted, the same assuming the position as shown at the record carrier A in Fig. 1, and thus causing the upper free end 40 of the lever 36 to engage the movable clutch member 12 to move the same into engagement with the clutch member 14. By this means, the shaft 9 is connected through the gear 20 to the operating gearing of the record carrier A, and such record carrier is thus rotated from the shaft 9 and consequently from the projector mechanism.

When the armature 38 is released, the same will assume the position as shown in connection with the record carrier B, Fig. 1, and thus permit the spring 17 of the clutch member 11 to free the clutch member 12 and consequently permit the free rotation of

the shaft 9 within the sleeve 15 of the clutch member 14. Thus with the parts in the position as shown on Fig. 1, the record carrier A is being operated by the projector while the record carrier B is inert.

It is essential inasmuch as the electromagnet 39 or 39' is energized only for an instant, and as will presently appear, from the detailed description of the electrical diagram as illustrated in Fig. 3, that the armature 38 and its arm 37 will be locked in the position as shown in Fig. 1 for connection with the record carrier A. In order to accomplish this, the trigger 41, is projected through the aperture 42 of the armature lever 36, and has its projection 43 disposed to overlap the edge of the aperture as clearly shown in Fig. 1 and thus hold the armature toward the electromagnet 39 with the clutch actuating end 40 holding the clutch member 12 locked to the member 14. The trigger 41 is provided with the armature 44, by means of which the electromagnet 45 or 45', as will presently appear controls the release of its respective trigger 41—41^a.

In the present instance, the projection 24 of the film F, is disposed to operate the switch S, and simultaneously energize the electromagnets 39 and 45', while the projection 25 will actuate the switch S' and simultaneously energize the electromagnets 39' and 45, thus simultaneously connecting and disconnecting through the switch S, the record carriers A and B, respectively, and causing the reverse simultaneous action when the switch S is closed.

In order to clearly illustrate the electrical connection by means of which the above operation is carried out, reference is had to Fig. 3, the circuit controlled by the projection 24 and the switch S being as follows:

One point of the switch S, the conductor 46, the battery 47, the conductor 48, the electromagnet 39, the conductor 49, the electromagnet 45', and the conductors 50 and 51 to the remaining member of the switch S. Thus as before stated, the electromagnets 39 and 45' are energized simultaneously, and at the beginning of the connection of the sound record carrier A with the projector mechanism, the clutch member 11 having been disconnected so that the shaft 9 would not operate the record carrier B, the clutch member 10 will be operated, and thus the record carrier A will be connected to be operated from the shaft 9. When the armature 38 controlled by the electromagnet 39, is actuated, the latch or trigger 41 automatically locks the same in clutch holding position or in the position as shown in connection with the record carrier A in Fig. 1, and thus the clutch 10 is held in this position until automatically released by the energization of the circuit controlled by the

switch S'. This circuit includes one member of the switch S', the conductor 52, the battery 53, the conductor 54, the electromagnet 45, the conductor 55, the electromagnet 39', the conductor 56, and the conductor 57, which is connected to the other point of the switch S'. Thus the electromagnets 45 and 39' are energized simultaneously, the electromagnet 45 elevating the latch or trigger 41 of the record carrier A and thus freeing the armature 38 to gravity and also the action of the spring 17 of the clutch 10 so that the clutch member 12 of the clutch is released from the member 14 thereof, while the electromagnet 39' attracts its armature 38 and consequently engages the clutch 11, the trigger 41^a at this time locking the clutch 11 to permit of the proper actuation of the record carrier B from the shaft 9, the record carrier A being disconnected from the shaft.

In the next succeeding actuation of the switch S, the trigger 41^a will be released through the energization of the electromagnet 45', and simultaneously with the energization of the electromagnet 39 and consequently the throwing of the clutch 10, this action disconnecting the clutch 11 and the record carrier B from the shaft 9 and again connecting the record carrier A through the clutch 10 to the shaft 9.

What is claimed is:

1. The combination with a motion picture projector and a plurality of sound reproducing mechanisms, a shaft being connected to and actuated by the projector mechanism, of means for alternately connecting and disconnecting the sound reproducing mechanisms to and from the shaft, the same including a plurality of clutches one to each sound reproducing mechanism, a film forming a part of the projector mechanism and having a plurality of switch actuators, switches respectively related to said clutches, a plurality of electro-magnets also related to said clutches, a source of electrical energy, a plurality of clutch throwing levers related respectively to said electro-magnets and clutches, a lock for each lever, an electromagnet for each lock, an independent electrical circuit including the source of electrical energy, a switch, and a lever controlling and a lock releasing electro-magnet whereby the closure of one switch will actuate one clutch and release the other.

2. The combination with a motion picture projector and two sound reproducing mechanisms, of a shaft connected to and operated by the projector and extending therefrom to all of the sound reproducing mechanisms, a plurality of clutches one to each sound reproducing mechanism mounted upon said shaft, one of the clutch members being a freely rotatable member and geared to its respective sound reproducing mechanism

and the other clutch member being a spring
released member keyed for sliding move-
ment upon the shaft, an armature lever
operably connected to each sliding clutch
5 member, an electro-magnet for attracting
said armature to move the sliding clutch
member in opposition to its spring, an arma-
ture lock for locking the armature lever in
such position, an electro-magnet for releas-
10 ing said lock and consequently the sliding
clutch member, and two electrical circuits
including the first mentioned electro-magnet

of one sound reproducing machine and the
second electro-magnet of the other machine,
whereby the clutches are alternately thrown 15
in and out.

In testimony that I claim the foregoing as
my own, I have hereto affixed my signature
in the presence of two witnesses.

HARRISON W. ROGERS.

Witnesses:

FRED J. WHELAN,
ANNIE M. SOMMERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

SYNCHRONIZING MECHANISM FOR MOTION PICTURE
AND SOUND REPRODUCING MACHINES.

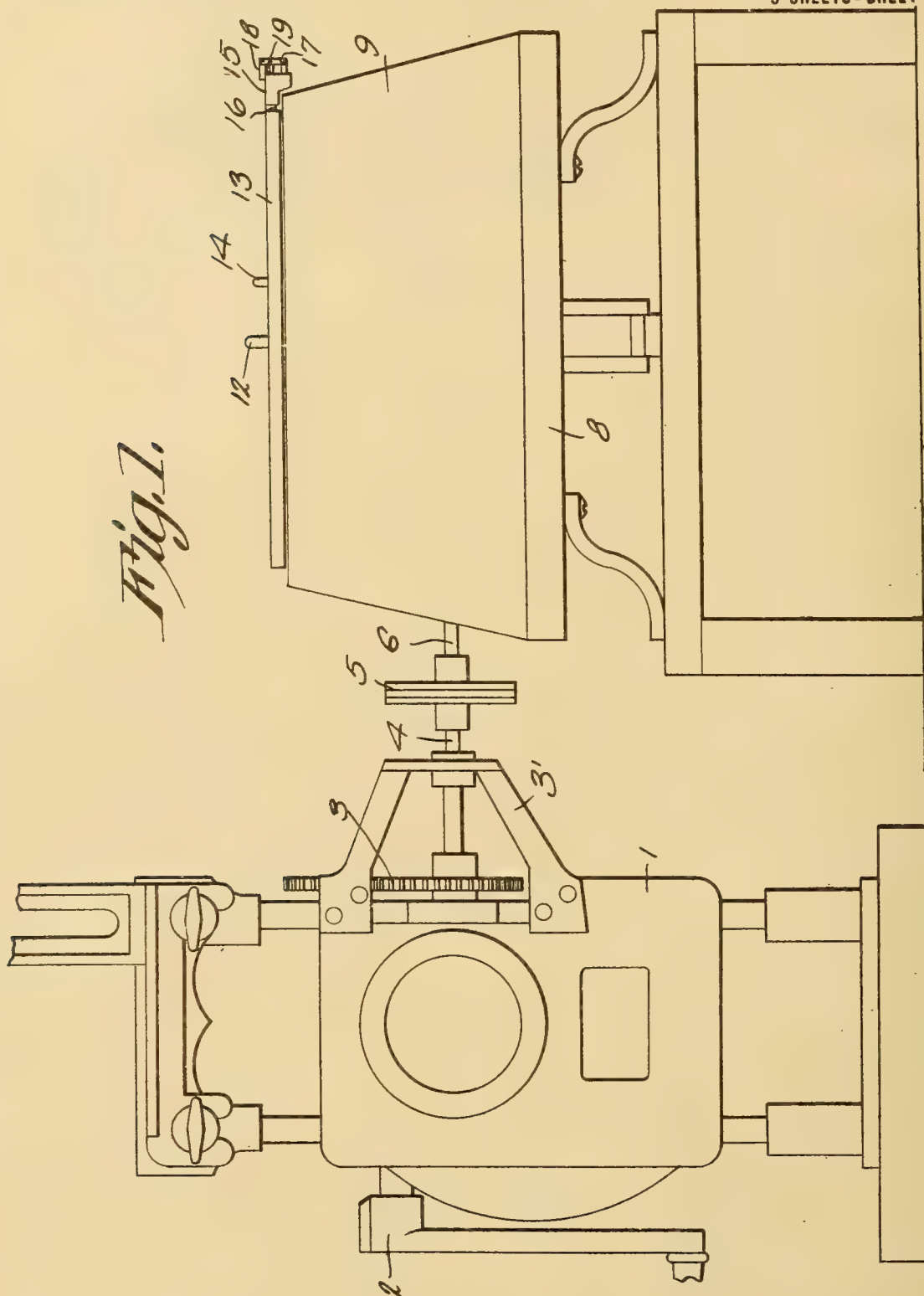
1,255,823 ----- H. W. Rogers,
Patented Feb. 5, 1918,
Filed Nov. 18, 1916.

SYNCHRONIZING MECHANISM FOR MOTION PICTURE AND SOUND REPRODUCING MACHINES.

Patented Feb. 5, 1918.

3 SHEETS—SHEET 1.

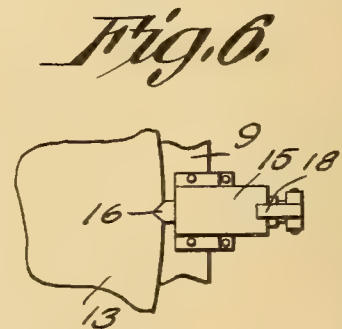
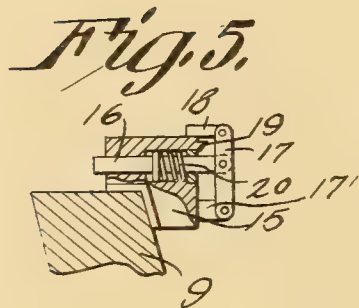
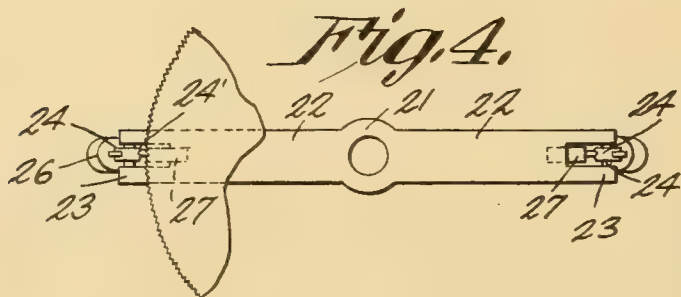
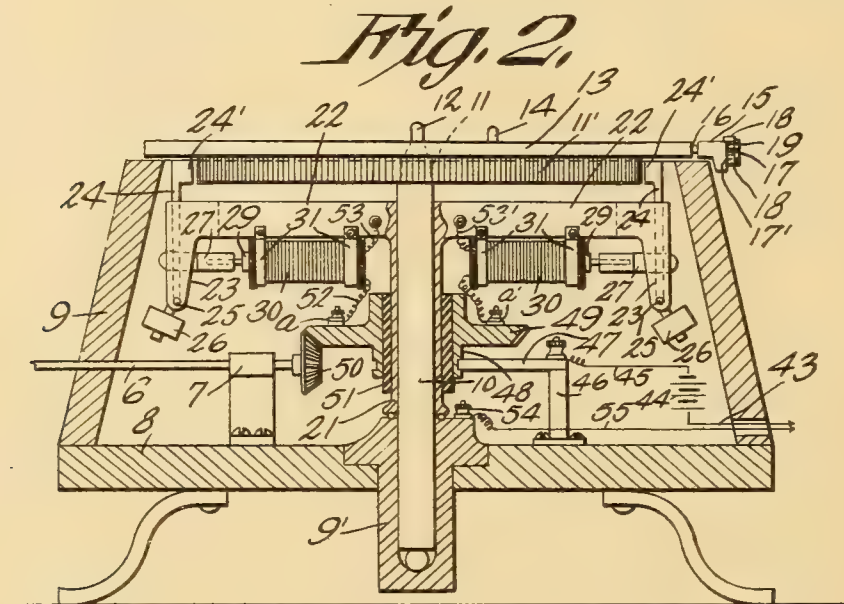
1,255,823.



Witnesses
J R Jones
R L Parker

Harrison W. Rogers, Inventor

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Attorneys



Harrison W. Rogers,

Witnesses

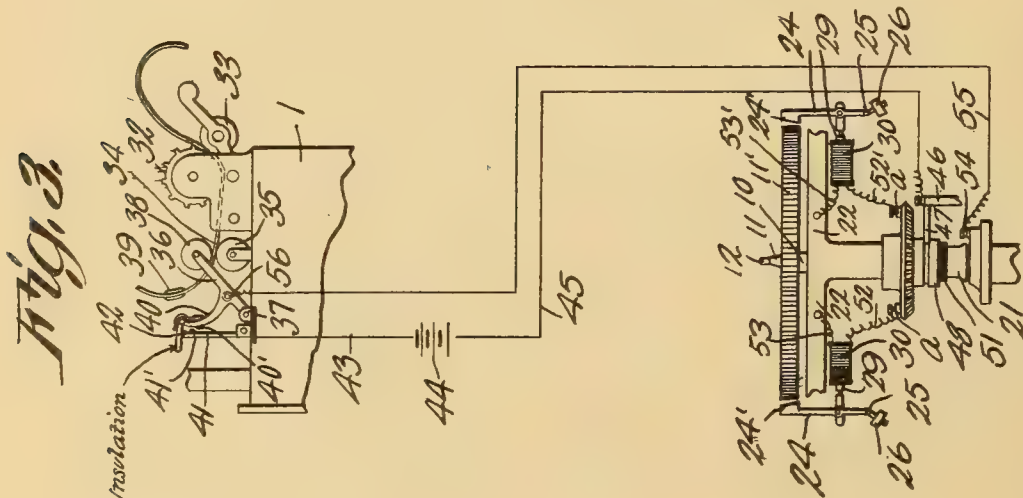
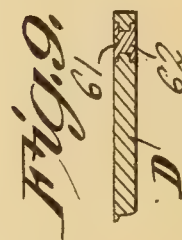
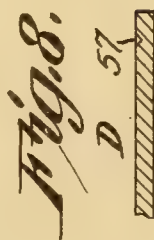
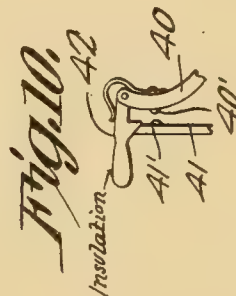
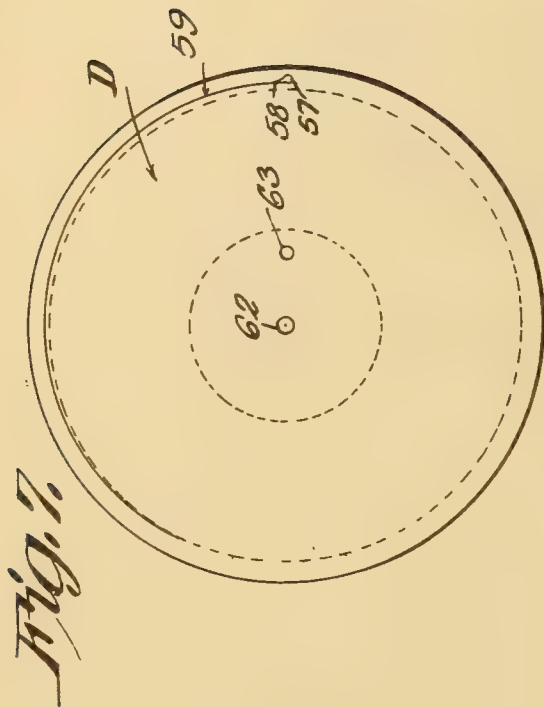
J. R. Dames
R. L. Parker

Inventor

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 Attorneys

H. W. ROGERS.
 SYNCHRONIZING MECHANISM FOR MOTION PICTURE AND SOUND REPRODUCING MACHINES.
 APPLICATION FILED NOV. 18, 1916.
 1,255,823. Patented Feb. 5, 1918.

3 SHEETS—SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

HARRISON W. ROGERS, OF WHEELING, WEST VIRGINIA.

SYNCHRONIZING MECHANISM FOR MOTION-PICTURE AND SOUND-REPRODUCING MACHINES.

1,255,823.

Specification of Letters Patent.

Patented Feb. 5, 1918.

Application filed November 18, 1916. Serial No. 132,118.

To all whom it may concern:

Be it known that I, HARRISON W. ROGERS, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Synchronizing Mechanism for Motion-Picture and Sound-Reproducing Machines, (Case B,) of which the following is a specification.

The present invention relates to improvements in synchronizing transmission mechanisms for motion picture and sound record carriers, one object of the invention being the provision of a synchronizing mechanism operably connected to and incased in the casing of a sound reproducing machine, and having a shaft for operable connection with the motor of a projector mechanism of a motion picture machine, the synchronizing mechanism being provided with an electrically controlled clutch means which is set in operation by coöperative means carried by and disposed in the path of the film, such means being set forth broadly and specifically in the application for patent for improvements in synchronizing mechanism for motion picture and sound reproducing machines filed Feb. 7, 1913, Serial No. 746,890.

In the present instance, the main clutch member and the means for operating the same are operably connected at all times with the motor of the projector, so that the same is rotated at the primary rotation of and with the projector motor, there being provided means disposed upon and in the path of the film to actuate the rotating clutch member to place the same in an operable engagement with the disk carrying platform so that the disk at the proper time will be rotated and held in operable connection with the projector mechanism so that the sound produced thereby will be in harmony or in synchronism with the projection of the images from the film, the projector mechanism controlling entirely the operation of the sound record carrier, while the film controls the operation of the clutch to connect the sound record carrier at the proper instant with the projector mechanism.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in

the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings—

Figure 1 is a front elevation of a projector mechanism operably connected to a disk sound record carrier, the casing for the synchronizing mechanism being shown in elevation.

Fig. 2 is a vertical central sectional view through the sound reproducing and synchronizing device casing with the platform carried clutch member in elevation.

Fig. 3 is an electrical diagram illustrating the film controlled switch and the electromotors for operating the movable clutch members to connect the platform carrying member of the record disk with the rotatable member.

Fig. 4 is a top plan view of the rotating arms and a portion of the platform carrying clutch member.

Fig. 5 is an enlarged detail sectional view of a portion of the casing showing the catch for engaging the periphery of the disk platform to hold the same against the normal rotative action due to the rotation of the rotary member of the clutch.

Fig. 6 is a top plan view thereof showing the same in operable engagement with the disk platform.

Figs. 7, 8 and 9 are detail views showing the disk provided with the depression and groove for properly positioning the reproducer stylus thereupon.

Fig. 10 is an enlarged detail view of the switch operated by the film showing the means for locking the same in closed position during the operation of the sound record carrier.

Referring to the drawings, the numeral 1 designates the casing of the projector, provided with a hand operated crank 2, which however, may be displaced by a motor where a motor is used, such projector as herein shown, being indicative of any form of projector mechanism that is now used or may be used, and having a gear wheel 3, which is one of the gears of the motor thereof. This gear wheel 3 may be positioned at various parts of the machine according to the pro-

jector upon which the present device is adapted to be used, it simply being desirable to operably connect the motor to the drive shaft 6 through any mechanism that
5 may be readily attached to the projector casing.

In the present instance, the bracket 3' is detachably connected to the projector casing, and has journaled therein the shaft 4,
10 which is operated from the gear 3, said shaft 4 being connected through the coupling 5 to the drive shaft 6 of the synchronizing mechanism, as will presently appear. The shaft 6, as clearly shown in Fig. 2, is journaled in the bracket 7 upon the base 8 of the
15 synchronizing mechanism casing 9, and upon the inner end of the shaft 6 is mounted the gear 50, which is the medium through which the movable clutch members of the synchronizing device are operated as will
20 later appear.

Mounted in the step bearing 9' concentrically with the base 8 of the casing 9, is a vertical shaft 10, the upper end of which is
25 reduced to provide the conical portion 11 and the record centering pin 12. Mounted upon the conical portion 11 is the geared disk 11', which constitutes the platform carried or carrying member of the clutch, which has disposed thereupon the disk platform 13, which has the eccentrically placed
30 pin 14, the purpose of which will presently appear. In order to lock the platform 13 against the normal tendency to rotate, a casing 15 is attached to the upper rim of the casing 9 and has mounted therein, the reciprocatory trigger or catch 16, which is disposed to engage a recess in the periphery of the platform 13, as clearly shown in Fig. 6,
40 to hold the platform and stationary clutch member 11' in locked relation and until the same is operably connected to be rotated through the shaft 6, as will presently appear. A lever 17 is operably connected to the outer end of the trigger 16, the lower
45 end being pivotally connected in the bracket 17', while the upper end is provided with the pivoted catch 18 disposed to engage the lug 19 of the casing 15 to hold the trigger retracted and out of engagement with the platform, when desired. Disposed upon the trigger 16 to normally maintain the same projected and in resilient engagement with the periphery of the platform 13, is the
50 spring 20, as clearly illustrated in Fig. 5.

Mounted anti-frictionally about and for rotation around the vertical shaft 10 is a sleeve 21, which is provided with the oppositely disposed arms 22, as clearly illustrated in Figs. 2 and 4, said arms each being provided with the depending bifurcated lugs or projections 23, between which are pivoted the movable clutch levers 24 provided with the toothed upper ends 24', for
65 engagement at diametrically opposite points

to the toothed periphery of the platform carrying clutch member 11'. These clutch levers 24 are pivoted at 25 to the lower end of the bifurcated projections 23, and carry upon their lower ends the pendant weights
70 26 which tend to normally hold the ends 24' away from the periphery of the clutch member 11'.

Connected to the levers 24 intermediate of their ends is a plate 27, said plate 27 being connected to its respective solenoid core 29, the said solenoid core being operably disposed with relation to its solenoid 30, which as clearly shown is supported through the straps 31 to its respective arm 22. Thus
75 two solenoids 30 are employed to operate the two clutch arms or levers 24, to, as will presently appear, properly engage at the desired time, the clutch member 11', so that the platform 13 may be rotated directly
80 from the projector mechanism.

As clearly shown in Fig. 3, the projector mechanism 1 is provided with the film feeding spools 32 and 33, between which is adapted to be fed as is the usual practice,
90 the film 34, being passed between the two rollers 35 and 38. The roller 35 is disposed in fixed relation to the projector frame 1, while the roller 38 is disposed in the upper end of the pivoted arm 36, whose lower end
95 is pivoted to and insulated at 37 from the projector frame 1. The roller 38 normally tends to hold the lever 36 downwardly and is operated to be moved to and from the roller 34 by means of the projection or stud
100 39 connected to and carried by the moving film 34. Thus when the projection 39 is disposed between the rollers 35 and 38, the roller 38 is moved upwardly so that when the arm 40 carrying the contact point 40' is
105 moved toward the arm 41 which carries the contact point 41' it thus closes the circuit for energizing the two electromagnets or solenoids 30, as clearly shown in Fig. 3. In order to maintain the contacts 40' and 41' in
110 closed relation after the elevation of the roller 38 by the projection 39 upon the film 34, a pivoted catch 42 is carried by the member 40 and is disposed to engage the upper end of the member 41, the said catch being
115 either gravity or spring actuated and being composed of insulation material so as not to cause the closure of the circuit when the points 40' and 41' are separated.

This switch is opened by the release of
120 the catch 42, such release being manual.

In order that the sleeve 21 and the arms 22 may be rotated from the shaft 6, the gear 50 is in mesh at all times with the gear 49 which is keyed upon the insulating sleeve 51
125 which in turn is fast upon the sleeve 21. thus the gear 49 is rotated at all times while the projector is being operated so that the arms 22 are also constantly rotated, the clutch members 24 being outward and disen-
130

gaged from the platform carrying clutch member 11' so that the platform through the catch or trigger 16 is maintained in a stationary position.

5 In operating the present machine, the film 34 is disposed therewithin as is usual, the button 39 being placed at a predetermined point upon the film so that as the projector is rotated the film is passed therethrough
10 and the projection 39 is brought into engagement with and between the rollers 35 and 38. Previous to this, the shaft 6 has been rotated and through the gears 50 and 49 is rotating the arms 22 and the clutch members 24. As soon as the projection 39
15 has caused the roller 38 to be elevated and the contacts at 40'—41' are engaged, the electrical circuit as illustrated in Fig. 3 is closed, and both of the solenoids 30 are
20 simultaneously energized to attract their cores and at the same time move both of the clutch members 24 inwardly so that their engaging ends 24' will be placed in engagement at diametrically opposite points to the
25 periphery of the clutch member 11', thus causing the platform 13 and the disk D carried thereby to be rotated at the instant of closure of the contacts 40'—41'.

30 The catch 42 as before described will maintain the contacts closed and thus continue the energization of the solenoid 30.

The circuit closed consists of the contact 41', the support 41, the conductor 43, the battery 44, the conductor 45, the binding
35 post 46, the resilient contact arm 47, the metal sleeve 48 of the gear 49, the gear 49, the two binding posts *a*—*a'*, the conductors 52—52', both solenoids 30, the conductors 53—53', the arms 22, the sleeve 21, the binding post 54, the conductor 55, the contact 56
40 connected to the lever 36, the arm 40 and the contact 40'.

By this means the disk D will be rotated in synchronism with the projector and the
45 film, the catch 42 being released manually when desired to open the circuit and de-energize the solenoids 30 so that the weights 26 will cause the clutch engaging arms 24' of the lever 24 to be freed from the clutch
50 member 11' so that the trigger 16 will offer sufficient resistance to bring the platform 13 and the disk D to a halt.

It is apparent that the catch 42 may be automatically released by attaching an armature thereto and including an offset projec-
55 tion as 39 to operate similar contacts 40'—41', to control an independent circuit containing an electromagnet to attract and release the catch 42.

60 A depression 57, having led therefrom an upwardly inclined depression 58, is provided at the beginning of the phonic groove of the disk D, the depression 58 terminating in the spiral groove 59. By this means the stylus
65 of the sound reproducing machine may be

properly retarded, whereby the stylus will enter the phonic groove at the proper place and time.

As shown in Fig. 9, the disk D is provided with a reinforcing insert 62, having the conical recess 61, which corresponds with the recess 57 formed integral with the disk, thus
70 producing a point in the record, that will withstand the wear of the original introduction of the stylus therewithin. 75

It is also desirable that the record D be provided with the two apertures 62 and 63, the aperture 62 being the one that fits upon the projecting end 12 of the shaft 10, while the aperture 63 fits upon the stud or pin
80 14, this arrangement rendering it necessary at all times that the record disk be placed properly upon the platform 13 at the initial starting of the machine, as it is impossible
85 to place the disk flat upon the platform without registering the two pins 12 and 14 with the apertures 62 and 63 which are of different diameters.

From the foregoing description, taken in connection with the drawings, it is evident
90 that the electrically actuated clutch members 24, which are operated due to the projection 39 carried by the film 34, said projection either of metal or any other material and either projecting from both or one side
95 of the film, will at the proper time start the rotation of the record carrier and record D, such time being determined according to the presentation of the image from the film, and due to the fact that the platform
100 13 is rotated through the synchronizing or transmitting mechanism operated solely from the projector. It is therefore evident that the disk will be rotated in harmony
105 with the film and that therefore the image with the various gestures will be in synchronism with the sound produced by the sound record.

It is also apparent that the mechanism herein shown can be readily applied to any
110 form of projector, the bracket 3 and the couplings 4, 5 and 6 being capable of variations and modifications according to the projector mechanism, and method necessary to connect it with the sound record carrier em-
115 ployed.

Having thus described the invention, what is claimed is:—

1. The combination with the projector of a motion picture machine, of a sound record
120 carrier, a clutch member for the carrier, a rotary clutch member operably connected to the projector, means for operating the rotary clutch member to connect the projector to the record carrier, said means compris-
125 ing a source of electrical energy, a switch disposed to be closed by the film, a lock for holding the switch closed after the switch has been actuated, an electromagnet operably connected to the rotary clutch member, 130

and a circuit including the source of electrical energy, the switch and the electromagnet, whereby when the circuit is closed, the electromagnet is energized and the clutch members held engaged.

2. The combination with the projector of a motion picture machine, its operating mechanism, a film having an abutment thereon at a predetermined point, and a sound record carrier, of mechanism for operating the carrier from the projector operating mechanism, including a clutch member connected to the record carrier, a rotating clutch member operably connected to the projector operating mechanism, a source of electrical energy, a switch disposed in the

path of the film to be closed by the abutment on the film, means for holding the switch closed after the switch has been actuated, an electromagnet operably connected to the rotating clutch member for operating the same, and a circuit including the source of electrical energy, the switch and the electromagnet.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HARRISON W. ROGERS.

Witnesses:

S. C. ADAMS,

F. S. WILLARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH RECORD STORAGE CABINET.

1,255,894 ----- A. F. Krueger,
Patented Feb. 12, 1918,
Filed July 31, 1916.

UNITED STATES PATENT OFFICE.

ADOLPH F. KRUEGER, OF MILWAUKEE, WISCONSIN.

PHONOGRAPH-RECORD STORAGE-CABINET.

1,255,894.

Specification of Letters Patent.

Patented Feb. 12, 1918.

Application filed July 31, 1916. Serial No. 112,281.

To all whom it may concern:

Be it known that I, ADOLPH F. KRUEGER, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Phonograph-Record Storage-Cabinets; and I do hereby declare that the following is a full, clear, and exact description thereof.

The present invention relates to new and useful improvements in storage cabinets for phonograph records or like articles.

It is primarily the object of the present invention to provide a storage cabinet for records, wherein the records are readily accessible, and wherein the disposition of the records in the cabinet may be most readily ascertained to thus eliminate the necessity for the inconvenient index of records usually employed in connection with record cabinets.

A further and important object of the invention resides in the provision of a storage cabinet wherein the various compartments are each adapted to operatively hold either ten inch or twelve inch records, thus permitting filing of the records in any desired logical order without reference to the size of the record.

A still further object of the invention resides in the provision of a record storage apparatus which may comprise a plurality of units adapted for association with the usual record storage compartment of a phonograph cabinet, whereby the present invention may be applied to various types of phonograph cabinets now in use.

With the above and other objects and advantages in view, the invention resides more particularly in the novel combination, arrangement and formation of parts more particularly hereinafter described and pointed out in the appended claims.

In the drawings:

Figure 1 is a horizontal sectional view through a record storage cabinet constructed in accordance with the present invention.

Fig. 2 is a front elevation of a unit of the cabinet.

Fig. 3 is a detail sectional view on the line 3—3 of Fig. 1, showing the limited holding means of the record carrying plates.

Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 1, showing the same structure.

Fig. 5 is a detail sectional view on the

line 5—5 of Fig. 1 showing the means for holding the cabinet within a record storage compartment.

Fig. 6 is a view showing the securing means of the front edges of the partitions.

Fig. 7 is a detail sectional view on the line 7—7 of Fig. 1, showing the combined finger piece and name tab.

Referring now more particularly to the accompanying drawings, there is shown one unit of a record storage apparatus, which comprises the casing 10 open at its front and provided with a plurality of horizontal partitions 11 dividing the casing into a desired number of record receiving compartments. These partitions are preferably formed of sheets of relatively stiff paper or other suitable material and are secured in the casing by engagement of their laterally turned side and rear edges therewith. The front edges of the partition sheets are bent about lengths of wire 12 and the ends of these wires project into the side walls of the casing 10, to thus procure a sufficiently stiff and relatively durable structure. Slidably seated on each of the partitions 11 is a record carrying plate 13, which has its side edges bent upwardly at 14 to somewhat stiffen the plate. Each of these plates is held for limited sliding movement within the casing by downwardly turned side edge portions 15, adjacent its forward end, which engage in slots 16 formed by cutting away the forward side portions of the partitions. As will be noted more particularly in Fig. 3, however, these record carrying plates may be withdrawn from the casing by pulling them outwardly to their forward limit of movement and then lifting the plates so that their stops 15 clear the slots.

To adapt these record carrying plates readily for use in connection with the different conventional sizes of records, holding blocks 17 are provided which are of a general triangular shape and which each have one apex portion pivoted at 18 to a rear side portion of the plate. One of the sides 19 of each block is curved throughout and adapted when the block is swung rearwardly to engage a large record, while another side has a portion curved at 20 to correspond to the curvature of and to engage a small record when the block is swung forwardly and the blocks are held in their swung position by abutment with the laterally turned side edges of the carrying plate.

To provide indicating tabs for the carrying plates, which form at the same time finger pieces whereby the plates may be readily manipulated, a sheet of transparent material 22 has one end passed through a slot 23 in the front edge portion of one side of each record carrying plate 13 and this end is bent forwardly to lie against the plate 13. Pasted or otherwise secured on the bottom of the plate 13 to cover the bent end of the transparent plate, is a third plate 24 which extends outwardly of the forward edge of the record carrying plate and the transparent plate 22 is also extended forwardly of the carrying plate 13 and has its forward end bent about the plate 24 to thus form a channel adapted to receive a symbol strip 25, on which is preferably designated the name of the record, and also an index number should it be desired to employ an index in connection with the present apparatus. The arrangement thus procured to hold the symbol strip 25, provides also a firm anchorage for the finger piece which is at the same time formed.

A plurality of casings 10, which as stated each comprise a unit of the present device, are adapted for disposition in the usual record storage chamber of a phonograph cabinet, and to prevent accidental displacement of the casings, the forward ends of their side walls are provided with open bottom recesses 26 in the rear portions of which are pivoted the ends of the bars 27 which extend outwardly of the recesses at the front of the walls and which carry intermediate spurs 28 adapted upon actuation of the bars to bite into the bottom of the record compartment, or into the side wall portions of a casing disposed thereunder.

It may, however, under some conditions be desired to associate the present record holding plates 13 with the storage record compartment of a phonograph cabinet during the manufacture thereof, and in this instance the casings 10 may be dispensed with and the partitions 11 secured directly to the walls of the compartment.

I claim:

1. A storage cabinet for phonograph records including a casing, a horizontal partition in the casing having a slot adjacent one side, and a record carrying plate slidable on said partition, one portion of the plate being bent downwardly and extended into the slot to limit sliding movement of the plate.

2. A storage cabinet for phonograph records including a casing, a horizontal partition having a slot adjacent its engagement with the wall of the casing, and a record carrying plate slidable on the partition and having its opposite sides bent laterally for engagement with the side walls of the casing, one portion of said laterally extended members being bent downwardly and disposed in said slot to limit sliding movement of the plate.

3. A storage cabinet for phonograph records including a casing, a pair of vertically spaced horizontal partitions, the lowermost partition having a slot adjacent its front end, a record carrying plate slidable on said lowermost partition, and a stop depending from the plate and disposed in the slot to limit sliding movement of said plate, said partitions being spaced apart a distance slightly greater than the length of said stop, whereby said plate may be slid out of said casing when the front end is raised to remove the stop from the slot.

4. A storage cabinet for phonograph records comprising a casing, a plurality of horizontal partitions in said casing, a record carrying plate slidably seated on each partition, and record holding blocks pivoted at the rear side portions of each record carrying plate and movable to engage and hold records of different sizes.

5. In a storage cabinet for records, a casing, a plurality of horizontal partitions in said casing, a record carrying plate slidably seated on each partition and provided with a slot adjacent its forward edge, a transparent plate having one end extended through said slot and laterally bent to lie under the record carrying plate, a second plate secured on the bottom of the record carrying plate adjacent the slot, and extended forwardly of said plate, the transparent plate being also extended forwardly of the record carrying plate and bent about the third plate to form a consequent recess, and a symbol strip disposed in said recess.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

ADOLPH F. KRUEGER.

Witnesses:

FRANK S. RATCLIFFE,
M. E. DOWNEY.

SOUND CONTROL MECHANISM.

1,256,025 ----- N. Kolby,
Patented Feb. 12, 1918,
Filed June 14, 1917.

N. KOLBY.
SOUND CONTROL MECHANISM.
APPLICATION FILED JUNE 14, 1917.

1,256,025.

Patented Feb. 12, 1918.

2 SHEETS—SHEET 1.

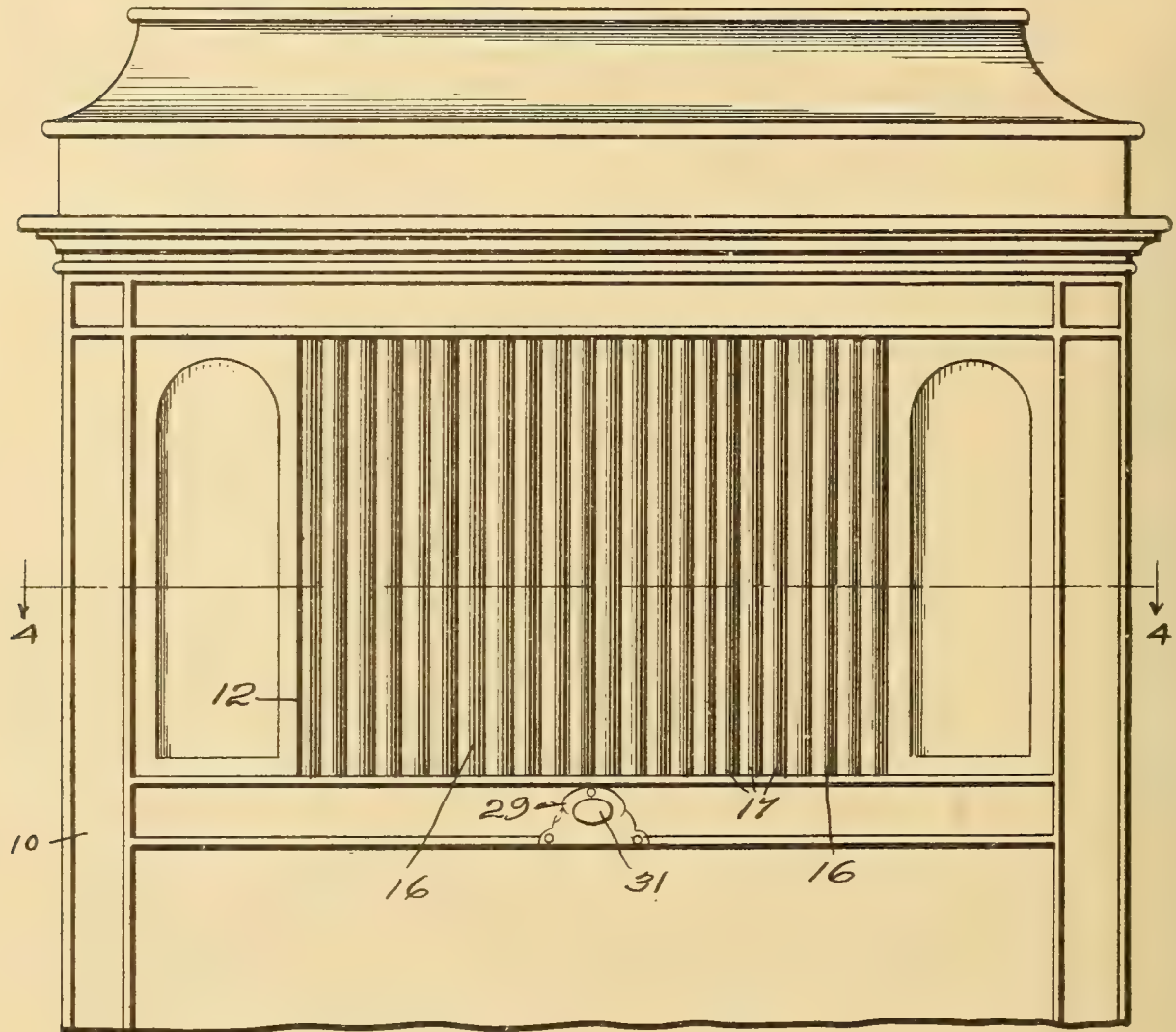


Fig. 1.

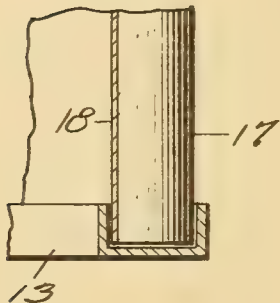


Fig. 2.

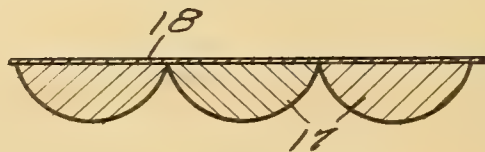


Fig. 3.

Inventor
Nicolas Kolby,

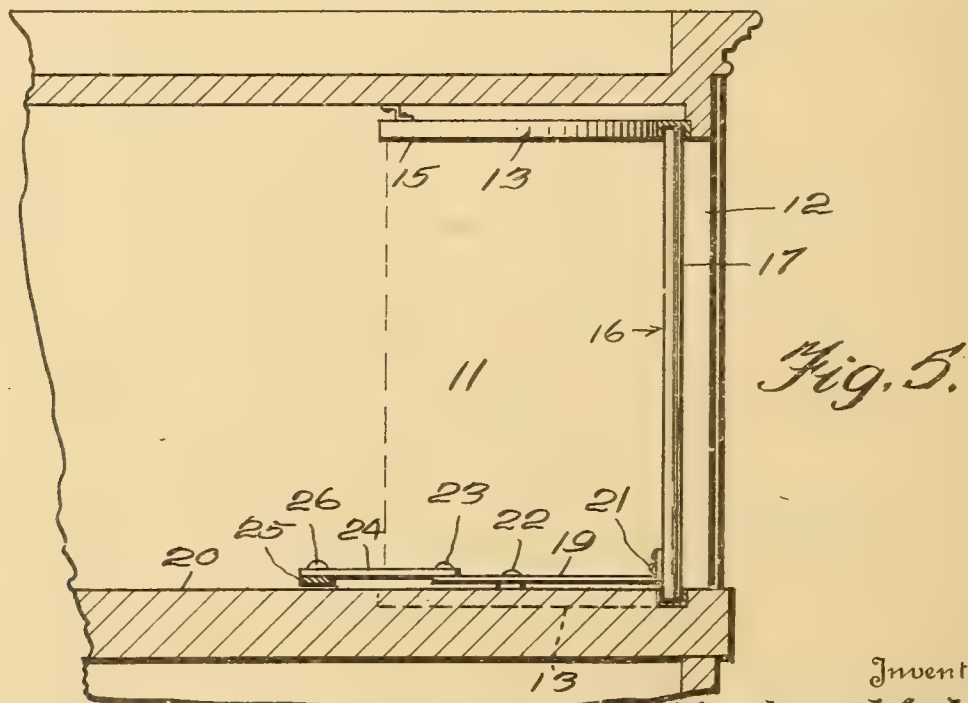
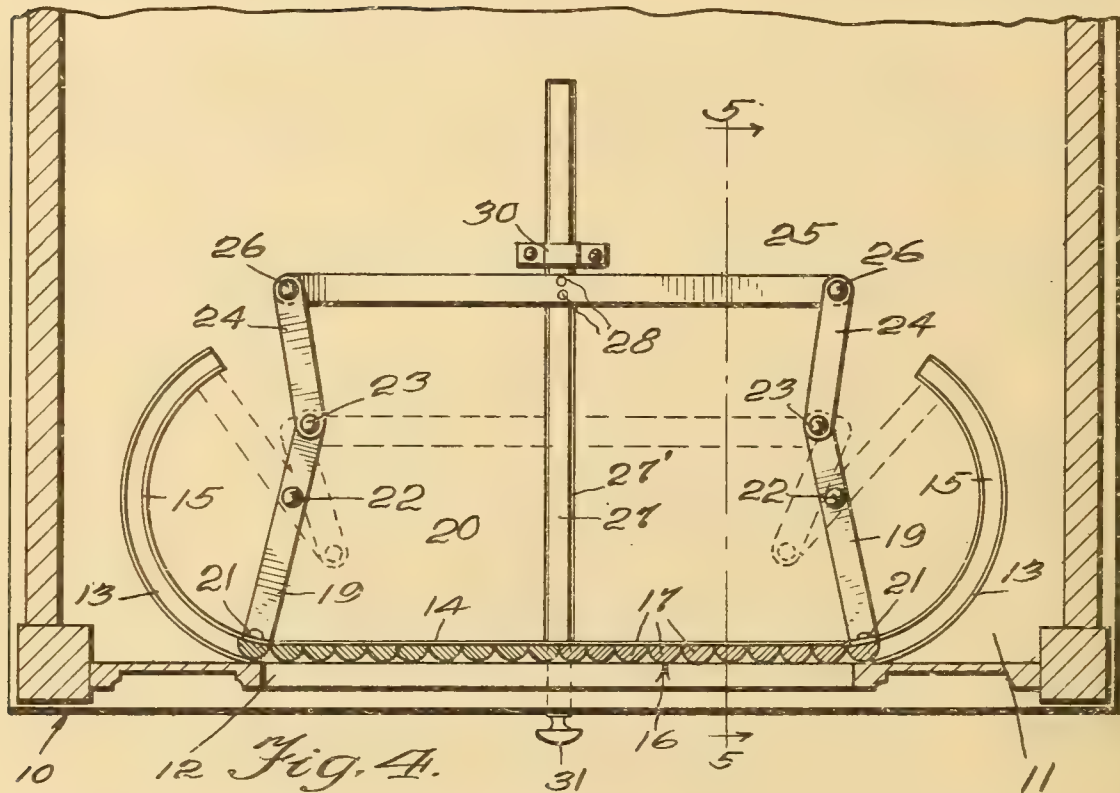
By *C. L. Parker.* Attorney

N. KOLBY.
SOUND CONTROL MECHANISM.
APPLICATION FILED JUNE 14, 1917.

1,256,025.

Patented Feb. 12, 1918.

2 SHEETS—SHEET 2.



Inventor
Nicolas Kolby,

By

C. L. Parker

Attorney

UNITED STATES PATENT OFFICE.

NICOLAS KOLBY, OF CHICAGO, ILLINOIS.

SOUND-CONTROL MECHANISM.

1,256,025.

Specification of Letters Patent.

Patented Feb. 12, 1918.

Application filed June 14, 1917. Serial No. 174,717.

To all whom it may concern:

Be it known that I, NICOLAS KOLBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sound-Control Mechanism, of which the following is a specification.

My invention relates to improvements in volume controlling apparatus for sound reproducing machines.

An important object of the invention is to provide apparatus of the above mentioned character, which is attractive in appearance, highly efficient in operation, and convenient to actuate.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of apparatus embodying my invention,

Fig. 2 is a detail transverse section through the lower track for the panel-curtain,

Fig. 3 is an enlarged horizontal sectional view through a portion of the panel-curtain,

Fig. 4 is a horizontal sectional view taken on line 4—4 of Fig. 1, and,

Fig. 5 is a transverse sectional view taken on line 5—5 of Fig. 4.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates the cabinet of a sound reproducing machine, having a sound chamber 11. The forward side of this sound box is provided with an opening 12.

Arranged at the top and bottom of the opening 12, and within the sound chamber 11, are tracks 13, held stationary by any suitable means. These tracks are preferably U-shaped in cross-section, as shown in Fig. 2. The tracks comprise straight central portions 14, and curved end portions 15, extending rearwardly within the sound chamber 11.

The numeral 16 designates flexible or foldable panel-curtains, having their upper and lower ends operating within and guided by the tracks 13. The panel-curtains 16 are preferably formed of slats or panels 17 of wood or other material, which are secured to a flexible strip 18, such as cloth.

The numeral 19 designates levers, arranged near the bottom 20 of the sound box 11 and attached to the outermost slats 17 of the panel-curtains 16, as shown at 21. The levers 19 are pivoted to the bottom 20, as shown at 22. The curved portions 15 of the tracks 13 are concentric with respect to the pivots 22.

The levers 19 project inwardly beyond the pivots 22 for a substantial distance and have pivotal connection, as shown at 23, with links 24, pivoted to the ends of a bar 25, as shown at 26. Means are provided to reciprocate the bar 25 transversely, comprising a rod or bar 27, secured thereto as shown at 28, and operating in a longitudinal groove 27'. The forward end of the bar 27 operates within an opening formed in a guide member 29, and the rear end thereof operates beneath the guide 30, which are stationary, as is obvious. Connected with the forward end of the rod 27 is a handle or knob 31, for shifting it.

The operation of the apparatus is as follows:

To close the panel-curtains 16, the bar 27 is moved inwardly. This movement of the bar 27 shifts the bar 25 inwardly which pulls upon the links 24, swinging the forward ends of the levers 19 toward each other, and sliding the panel-curtains to the closed position. When the knob 31 is drawn forwardly, it is obvious that the opposite of this operation occurs, and the panel-curtains 16 will be shifted to the open position. By proper manipulation of the knob 31, the panel-curtains 16 may be opened to any desired extent, thus controlling the volume of sound from the machine.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. The combination with a sound chamber of a sound reproducing machine having an opening; of substantially horizontal tracks arranged near the top and bottom of the opening and extending longitudinally thereof and having rearwardly curved end portions; pivoted levers arranged inwardly

of and near the curved end portions and having their pivot disposed concentric with respect to the track end portions; flexible panel curtains arranged to operate in contact with the tracks and having connection with the levers; a reciprocatory rod extending longitudinally of the sound chamber near the central portion thereof; and operating connecting means between the rod and the corresponding ends of the levers.

2. The combination with a sound chamber of a sound reproducing machine having an opening; of substantially horizontal tracks arranged near the top and bottom of the opening and extending longitudinally thereof and having rearwardly curved end portions; swinging levers arranged inwardly of and near the curved track end portions; pivot supports for the levers arranged between the ends thereof with the inner ends of the levers extending rearwardly beyond the same for substantial distances, said pivot supports being concentric with respect to the curved track end portions and the rear ends of the levers being arranged upon the inner sides of the pivot supports; flexible panel curtains arranged to operate within the tracks and having connection with the forward ends of the levers; a reciprocatory rod extending longitudinally of the sound chamber and near the central portion thereof; a transverse member secured to the rod; and links connected with the ends of the transverse member and with the rear ends of the levers, so that the panel curtains will be in the closed position when the reciprocatory rod is moved to the inner position.

3. The combination with a sound chamber of a sound reproducing machine hav-

ing an opening; of substantially horizontal tracks arranged near the top and bottom of the opening and extending longitudinally thereof and having rearwardly curved end portions; pivoted levers arranged inwardly of and near the curved end portions with their pivots disposed concentric with respect to the curved track end portions; flexible panel curtains arranged to operate in contact with the tracks and having connection with the levers, links pivotally connected with the rear ends of the lever and disposed permanently upon one side of the pivots of the levers; a transversely reciprocatory bar pivotally connected with the ends of the links; and a reciprocatory rod rigidly attached to the bar between its ends and projecting to the exterior of the sound chamber.

4. The combination with a sound chamber of a sound reproducing machine having an opening, of substantially horizontal tracks arranged near the top and bottom of the opening and extending longitudinally thereof and having rearwardly curved transverse end portions; a pivoted lever arranged inwardly of and near the curved transverse end portion with its pivot disposed concentric with respect to the curved end portions of the tracks; a flexible panel curtain arranged to operate in contact with the tracks and having connection with the forward end of the lever; and means to swing the lever upon its pivot.

In testimony whereof I affix my signature in presence of a witness.

NICOLAS KOLBY.

Witness:

EMANUEL JOSEF WINKLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

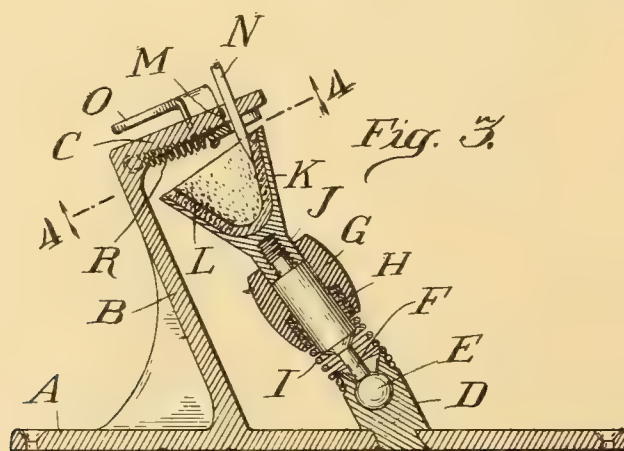
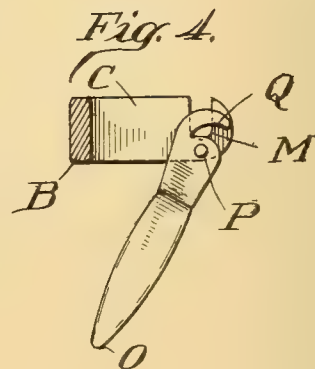
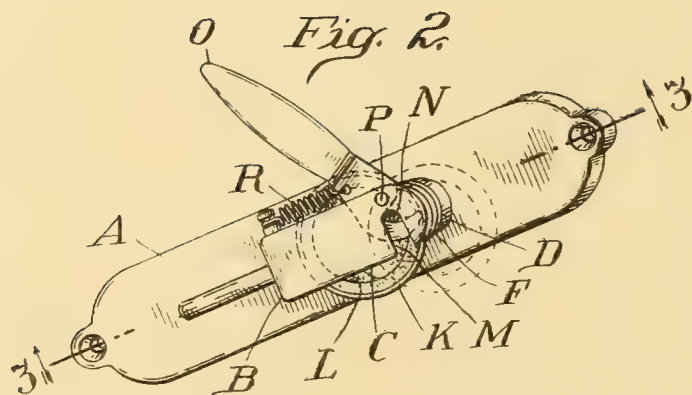
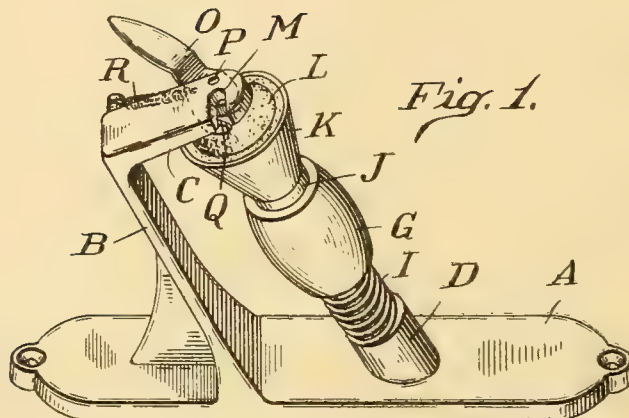
NEEDLE SHARPENER.

1,256,034 ----- H. L. Notter,
Patented Feb. 12, 1918,
Filed May 11, 1917.

H. L. NOTTER.
NEEDLE SHARPENER.
APPLICATION FILED MAY 11, 1917.

1,256,034.

Patented Feb. 12, 1918.
2 SHEETS—SHEET 1.



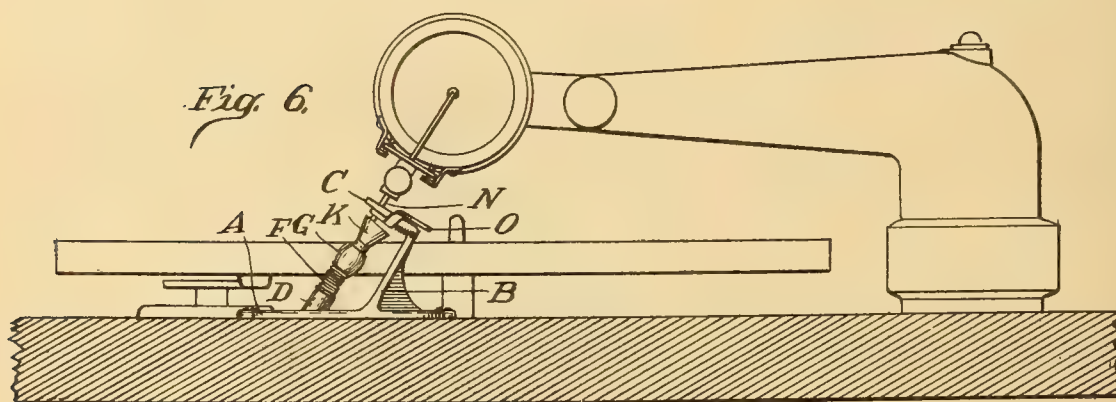
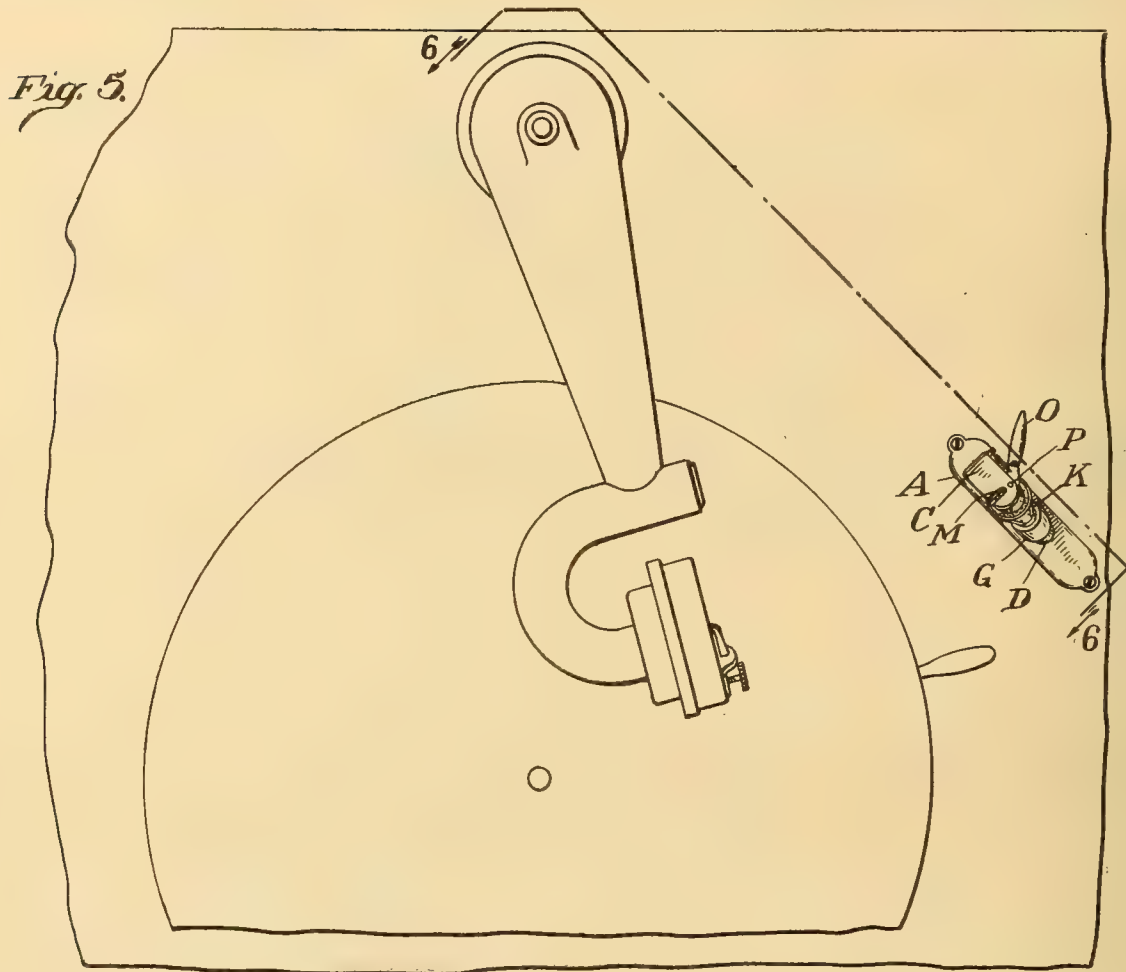
Witness
Milton Lenon

Inventor:
Harry L. Notter
Rudolph M. [Signature]
Attorney

H. L. NOTTER.
NEEDLE SHARPENER.
APPLICATION FILED MAY 11, 1917.

1,256,034.

Patented Feb. 12, 1918.
2 SHEETS—SHEET 2.



Inventor:

Witnesses
Hulton Lenoir

Harry L. Notter,
Attorney.

UNITED STATES PATENT OFFICE.

HARRY L. NOTTER, OF CHICAGO, ILLINOIS.

NEEDLE-SHARPENER.

1,256,034.

Specification of Letters Patent.

Patented Feb. 12, 1918.

Application filed May 11, 1917. Serial No. 167,863.

To all whom it may concern:

Be it known that I, HARRY L. NOTTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Needle-Sharpener; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object to provide a device for sharpening needles, and which is particularly adapted for sharpening needles of metal or other material used on phonographs or other sound-reproducing apparatus.

The invention has for its main object to provide a needle-sharpening attachment for sound-reproducing instruments constructed and arranged with relation to the sound-box thereof, and the horn carrying such sound-box so that when it is desired to sharpen a needle engaged with the sound-box the latter may be swung on the pivot of the horn so that the needle enters the sharpening means and is held firmly in position with relation to the sharpening element, and may then be sharpened and returned to normal position for playing further records.

The invention has for its further object to provide a small, simple and efficient device of the character set forth which may be easily attached to the casing of a sound-reproducing instrument in position for ready operation to resharpen needles used thereon.

The invention consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings illustrating a suitable embodiment of the invention: Figure —1— is a perspective view of a needle-sharpening device constructed in accordance with my invention.

Fig. —2— is a top plan view of the same.

Fig. —3— is a vertical longitudinal section of the same on the line 3—3 of Fig. —2—.

Fig. —4— is a fragmentary detail section on the line 4—4 of Fig. —3—.

Fig. —5— is a fragmentary view in side elevation partly in section showing a portion of the casing of a sound-reproducing

instrument equipped with a needle-sharpening device constructed in accordance with the invention.

Fig. —6— is a top plan view of the same.

My said device comprises a base plate A equipped with an inclined standard B preferably cast integral therewith and provided at its upper end with a flange C extending at right angles to the standard B and at an incline to the base plate A. Mounted on the latter is a cup bearing D which receives the ball E at the lower end of a shaft F which carries a sleeve G preferably of rubber or similar yielding material projecting at one end beyond the upper end of said shaft. The said sleeve G is provided in its lower end with an annular groove H receiving the upper end portion of a helical spring I which is secured to the upper end portion of the cup bearing D. The connection between the latter and the ball E is such as to provide a universal joint between the shaft F and said cup D. Removably mounted upon the upper end of the shaft F and within the upper end portion of the sleeve G is the stem J of a hollow cone K which is provided interiorly with a grinding surface L containing carborundum, emery or other well-known grinding material. The spring I normally supports the shaft F in axial alinement with the inclined axis of the cup-bearing D and substantially parallel with the standard B.

The flange C is provided with a slot M disposed substantially in axial alinement with the inclined axis of the cup-bearing D and through which the needle to be sharpened is adapted to project into the hollow cone K. The needle may be manually held in the position shown in Fig. —3—, or the same may be engaged with the sound box of the instrument to afford a ready means of holding the needle in proper position in the opening in the flange C and projecting into the said hollow cone K. Preferably a clamping element is provided to coact with the inner wall of the slot M to hold the needle firmly in position. A suitable clamping member consists of a lever O pivotally secured between its ends, as at P, to the flange C at one side of the said slot M. The short end of said lever is provided with an arcuate slot Q which is adapted to receive

the portion of the needle projecting through the slot M, and which, when said lever O is turned on its pivot in one direction, is forced by the walls of the arcuate slot Q into firm
 5 engagement with the inner end wall of the slot M. A spring R engaged with said lever O serves to hold the same normally in the position shown in Fig. —4— to engage the needle and press it against the inner end
 10 wall of the slot M.

In operation a needle is positioned substantially as shown in Fig. —3—, and the hollow cone K is then manually rotated with a gyratory motion while maintaining
 15 the inner surface of the lining L in contact with the needle point; this gyratory rotation being readily accomplished against the slight resistance offered by the spring I and serving obviously to cause the needle point
 20 to be ground equally on all sides so as to give the same a true, or substantially true, new conical point. A single revolution of the hollow cone K is usually all that is required to again place a needle in condition
 25 for use in the instrument.

As shown in Figs. —5— and —6— the said plate A is secured upon the top plate of the casing or housing of the sound-reproducing mechanism of a phonograph, and
 30 contiguous to the rotatable disk adapted to contain the record and within the arc through which the needle carried by the sound-box is adapted to be swung upon turning the horn carrying the sound-box
 35 pivotally; the slot M being accurately positioned to lie in the path of the needle so as to receive the same and the angle of inclination of the standard B and flange C being such as to accord with the inclination
 40 of the needle when disposed in operative position relatively to the record. The normal axis of the grinding element is similarly positioned to accord with the inclination of the needle so that, when it is desired to grind
 45 the needle it is only necessary to swing the horn of the instrument until the needle enters the slot M of the flange C, and by swinging the lever O against the action of the spring R, allowing the needle to engage
 50 the inner end wall of said slot M. The lever O is then released and the hollow cone K sprung over the needle point so that the latter projects into the same. The cone K is now rotated with a gyratory motion
 55 about the needle point as an axis while maintaining the surface L in contact therewith.

While I have shown the preferred embodiment of my invention in the accompanying drawing, it will be obvious, of course,
 60 that the same may be otherwise embodied without departing from the invention as defined in the appended claims.

I claim as my invention:

1. A needle point grinder including a hollow cone equipped with an interior tapered

grinding surface, and a flexible support for said cup permitting the same to be manually gyrated about an axis eccentric to the axis of said hollow cone and coincident with that of a needle projecting into the same
 70 and maintained in contact with the interior surface of said cup as the latter is gyrated.

2. A needle point grinder including a hollow cone equipped with an interior tapered grinding surface, and a flexible support for
 75 said cup permitting the same to be manually gyrated about an axis eccentric to the axis of said hollow cone and coincident with that of a needle point projecting into the same and maintained in contact with the
 80 interior surface of said cup as the latter is gyrated, in combination with means for rigidly supporting a needle normally positioned in axial alinement with said hollow cone.
 85

3. In a sound-reproducing machine equipped with a pivoted carrier and a sound box equipped with needle-engaging means mounted on said carrier, needle-point grinding means mounted on a rigid part of
 90 the instrument and including a rigid element having a recess disposed in the path of and adapted to receive a needle held in said needle-engaging means of said sound-box for accurately positioning said needle
 95 with respect to a grinding element, and a grinding element associated with said recessed element adapted to be manually gyrated about the axis of said needle while maintained in surface contact therewith.
 100

4. In a sound-reproducing machine equipped with a pivoted carrier and a sound box equipped with needle-engaging means mounted on said carrier, needle-point grinding means mounted on a rigid part of the
 105 instrument and including a rigid element having a recess disposed in the path of and adapted to receive a needle held in said needle-engaging means of said sound-box for accurately positioning said needle with
 110 respect to a grinding element, manually operable means for holding the needle engaged in said recess, and a grinding element associated with said recessed element adapted to be manually gyrated about the axis
 115 of said needle while maintained in surface contact therewith.

5. In a sound-reproducing machine equipped with a swinging member provided with needle-engaging means, means for
 120 sharpening a needle carried by said member including a rigid element having a recess disposed in the path of and adapted to receive said needle for accurately positioning the same with respect to grinding
 125 means, and a hollow cone having an interior tapered abrasive surface and into which the needle point is adapted to project when disposed in said recess, and a flexible support for said hollow cone permitting the same
 130

to be gyrated about the needle point as an axis while maintaining said abrasive surface in contact therewith.

5 6. In a sound-reproducing machine equipped with a swinging member provided with needle-engaging means, means for sharpening a needle carried by said member including a rigid element having a recess disposed in the path of and adapted
10 to receive said needle for accurately positioning the same with respect to grinding means, manually operable means for holding the needle engaged in said recess, and a hollow cone having an interior tapered ab-

rasive surface and into which the needle 15 point is adapted to project when disposed in said recess, and a flexible support for said hollow cone permitting the same to be gyrated about the needle point as an axis while maintaining said abrasive surface in contact 20 therewith.

In testimony whereof I have signed my name in presence of two subscribing witnesses.

HARRY L. NOTTER.

Witnesses:

M. M. BOYLE,

C. L. BALDWIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH ATTACHMENT.

1,256,099 ----- Robert L. Baker,
Patented Feb. 12, 1918,
Filed Mar. 31, 1916.

R. L. BAKER.
 PHONOGRAPH ATTACHMENT.
 APPLICATION FILED MAR. 31, 1916.

1,256,099.

Patented Feb. 12, 1918.

Fig 1

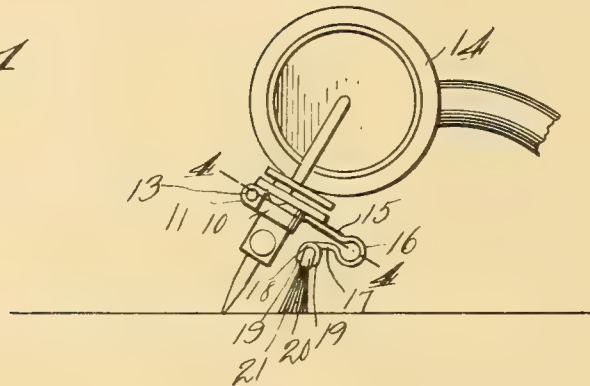


Fig 2

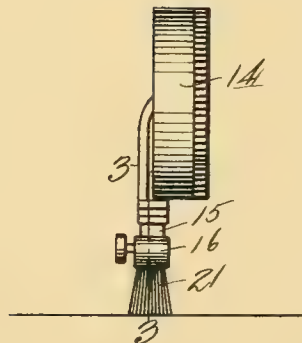


Fig 3

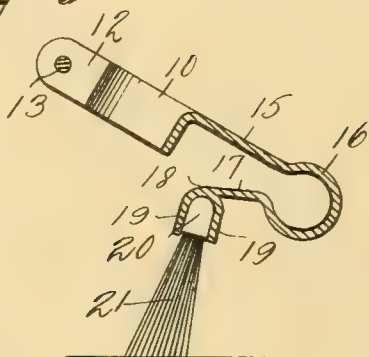
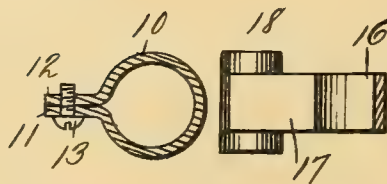


Fig 4



Inventor
 R. L. Baker

Witnesses
 H. M. Test.

By *Charles Chandler*

Attorney

UNITED STATES PATENT OFFICE.

ROBERT L. BAKER, OF AURORA, NEW YORK, ASSIGNOR OF ONE-HALF TO HENRY MORGAN, OF AURORA, NEW YORK.

PHONOGRAPH ATTACHMENT.

1,256,099.

Specification of Letters Patent. Patented Feb. 12, 1918.

Application filed March 31, 1916. Serial No. 88,157.

To all whom it may concern:

Be it known that I, ROBERT L. BAKER, a citizen of the United States, residing at Aurora, in the county of Cayuga, State of New York, have invented certain new and useful Improvements in Phonograph Attachments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in phonograph attachments and particularly to devices for cleaning a record in advance of the needle so as to remove particles of dirt and dust therefrom.

I am aware of the fact that devices have been provided for the same purpose as my invention but by reason of the particular construction of my device and by reason of the specific way in which it is mounted upon the native parts of the talking machine, I attain advantages not attained by the previous devices. One disadvantage of such devices already produced is that they are attached to the shell of the sound box and since they include spring elements, they present readily vibrated bodies which are in position to receive their vibrations from the diaphragm of the sound box through the shell of the sound box and when the phonograph is in operation there is a tendency for such devices to vibrate with a singing sound and interfere with the clear tones of the instrument. In my construction, as will be apparent from the following description, the device is mounted upon the stem of the needle post and moves therewith as the needle post is moved with the needle. The needle post, of course, has a positive movement with the needle and not a vibration such as is imparted to the diaphragm and thus the tendency of the metal portions of my device to vibrate is prevented.

One object of the invention is to provide a device of this character which is resilient in its nature so as to readily accommodate itself to varying conditions due to the use of longer or shorter needles.

Another and primary object of the present invention is to provide a cleaning brush which may be mounted upon the stem of the needle post of a sound box and which will lie with its brush portion transversely of the line of movement of the record so that with

the lateral movement of the needle as it engages the sides of the record groove, the brush will also move laterally and, as a result of this movement will more thoroughly clean the record groove.

Another object is to provide a structure in which, while the brush portion is movable vertically with respect to the needle and is held against the record by spring action, there will be resistance to lateral movement of the brush with respect to the needle so that the brush will move with the needle positively as stated above.

Another object is to provide a device of this character in which the cleaning element or brush can be removed when worn out and a new one placed therein, without the necessity for removing the device from the phonograph.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawing.

In the drawing:

Figure 1 is an enlarged elevation of my invention applied to the needle clamp of a phonograph sound-box;

Fig. 2 is a front elevation;

Fig. 3 is an enlarged vertical section on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged section on the line 3—3 of Fig. 1.

Referring particularly to the accompanying drawing, 10 represents a clamp which is provided with a pair of arms 11 and 12, the former of which has a smooth bored opening while the latter has a threaded opening. Disposed through these openings, from the smooth opening is a screw 13 by means of which the clamp is secured around the stem or needle post of the sound box 14 of the phonograph. Formed integrally on this clamp is the forwardly extending resilient arm 15, the outer end of which is bowed as at 16 to provide a resilient element, and from this resilient bow there is extended downwardly and rearwardly toward the needle a shorter arm 17. Secured to the under face of the outer end of this arm 17 is a transversely extending member 18 having a pair of spring jaws 19 for the detachable reception of the back 20 of the brush 21, which thus extends transversely of the needle. As shown, the arms 15 and 17 and the clamp are formed integral and they are

made of flat spring metal, the transverse dimension of which extends transversely of the plane occupied by the needle and parallel with the plane of movement of the 5 needle during operation of the phonograph.

The device is so applied to the needle post that the brush engages the face of the record in advance of the needle so that all dirt and foreign substance will be swept out of the 10 grooves before the needle passes thereinto. The fact that the device is attached to the needle post insures that the brush will always contact with the face of the record no matter how long or short a needle is used 15 and by reason of the resiliency imparted to the device through the member 16, the brush will at all times be held firmly pressed against the face of the record.

From the foregoing it will be seen that the 20 present device, attached as it is to the stem of the needle post, will move with the needle post as the needle is engaged by the convolutions at the sides of the record groove and thus the brush will be shifted slightly transversely of the groove to effect a more thorough cleaning. By reason of the fact that 25 the spring portions are flat and are engaged with their transverse dimensions transversely of the needle, any tendency of the needle post to move laterally independently of the brush is resisted, while movement of the needle post and needle vertically with respect to the brush is permitted by the resiliency of the spring parts. 30

Again by the fact that the mounting of the brush includes the spring portion returned upon itself, the brush is brought into close proximity to the needle so that the cleaning operation occurs just in advance of the 35 needle. 40

What is claimed is:

1. The combination with the sound box of a phonograph and its needle post, of a means for cleaning a record in connection

with which the sound box may be used, said 45 cleaning means consisting of a clamp rigidly engaged with the stem of the needle post, a spring arm carried by the clamp and extending laterally therefrom and returned 50 downwardly and inwardly upon itself toward the post, and a brush carried by the detached end of the spring arm and arranged to extend transversely of a needle engaged in the needle post and to lie in advance thereof and in engagement with a rec- 55 ord in connection with which the sound box may be used, said spring arm being formed of flat metal disposed with its major transverse dimension transversely of the needle plane whereby lateral movement of the 60 needle post with respect to the brush is resisted.

2. A cleaning device for phonograph record disks consisting of a clamp adapted to be engaged upon and secured to the needle 65 post of a sound box, a spring arm carried by the clamp end extending laterally therefrom and returned inwardly upon itself, to produce portions in overlapping relation, said arm having a bowed portion at the 70 junction of its overlapping portions, and a brush carried by the detached end of the returned portion and arranged to lie transversely of a needle engaged in the needle post with which the clamp may be engaged 75 and disposed to engage the surface of a record disk in advance of such a needle, said spring arm being formed of flat resilient metal and disposed to lie with its major transverse dimension transversely of the 80 needle plane when the clamp is engaged with a needle post.

In testimony whereof, I affix my signature, in the presence of two witnesses.

ROBERT L. BAKER.

Witnesses:

JOHN HICKEY,
EDMUND DAUGHTY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

COMBINED DRIVING, GOVERNOR, SPEED REGULATING
AND SPEED INDICATING MECHANISM FOR TALKING MACHINES.

1,256,154 ----- H.H. Murray & W. D. La Rue,
Patented Feb. 12, 1918,
Filed Nov. 11, 1912, Renewed
July 9, 1917.

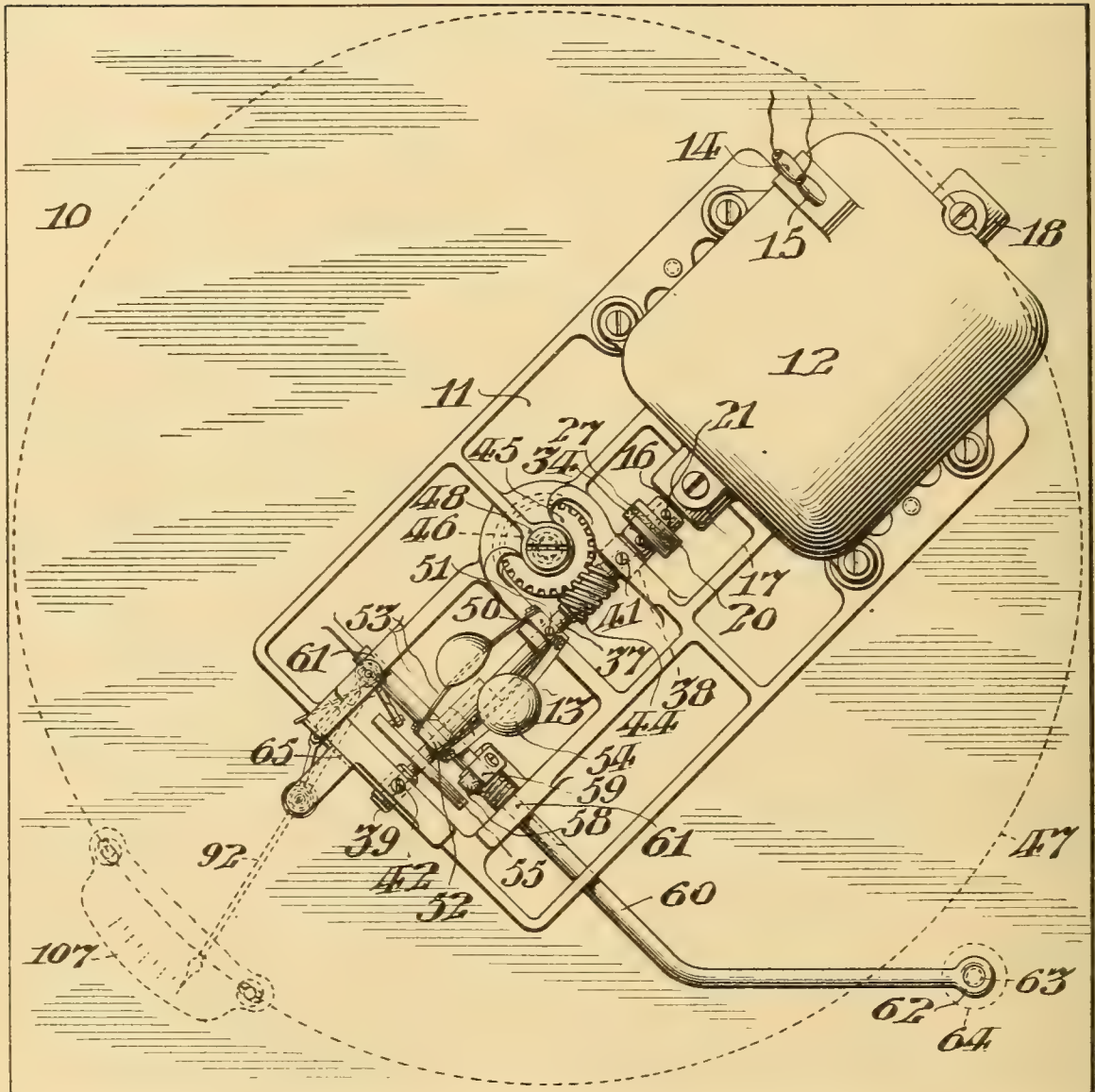
H. H. MURRAY & W. D. LA RUE.
 COMBINED DRIVING, GOVERNOR, SPEED REGULATING AND SPEED INDICATING MECHANISM FOR
 TALKING MACHINES.

APPLICATION FILED NOV. 11, 1912. RENEWED JULY 9, 1917.

1,256,154.

Patented Feb. 12, 1918.
 3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES

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Harold Pettit

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 WILLIAM D. LA RUE,

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 COMBINED DRIVING, GOVERNOR, SPEED REGULATING AND SPEED INDICATING MECHANISM FOR
 TALKING MACHINES.

APPLICATION FILED NOV. 11, 1912. RENEWED JULY 9, 1917.

1,256,154.

Patented Feb. 12, 1918.

3 SHEETS—SHEET 2.

FIG. 2.

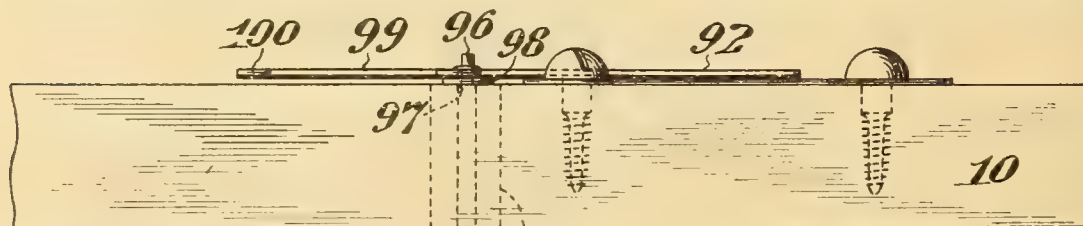
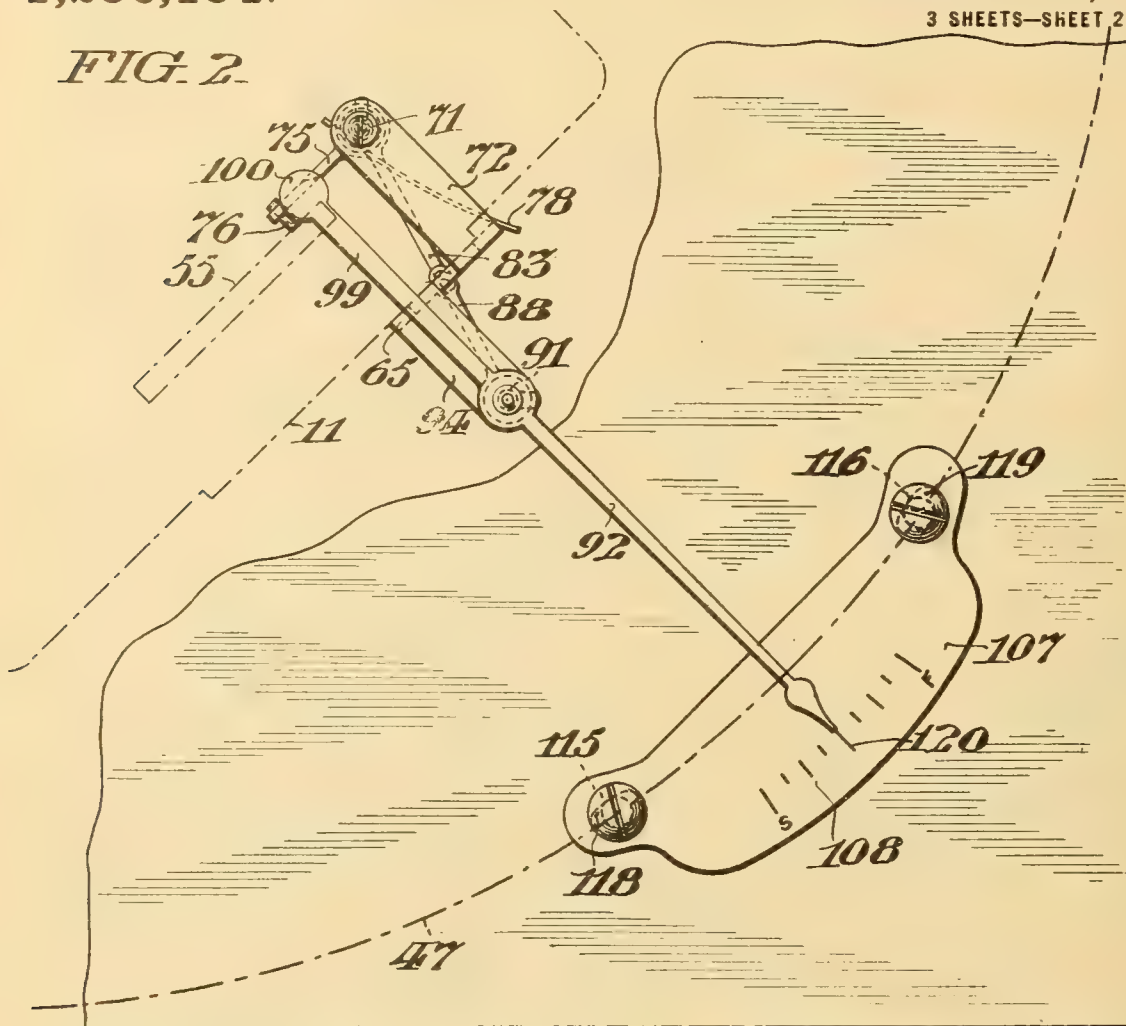
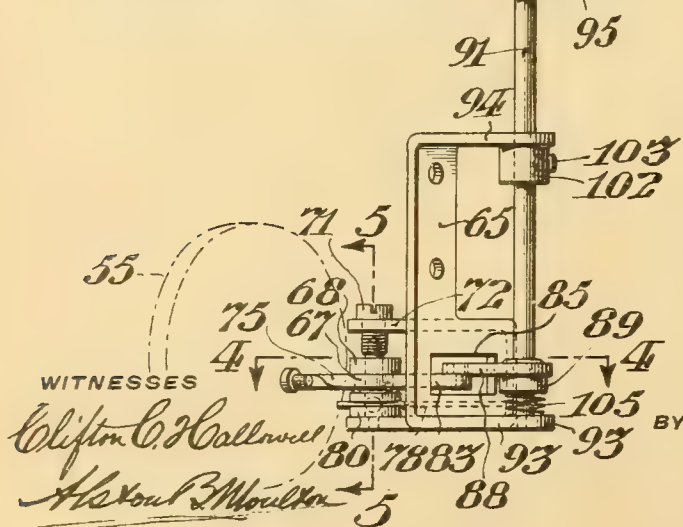


FIG. 3.



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Clifton C. Hall

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 COMBINED DRIVING, GOVERNOR, SPEED REGULATING AND SPEED INDICATING MECHANISM FOR
 TALKING MACHINES.

APPLICATION FILED NOV. 11, 1912. RENEWED JULY 9, 1917.

1,256,154.

Patented Feb. 12, 1918.

3 SHEETS—SHEET 3.

FIG. 4.

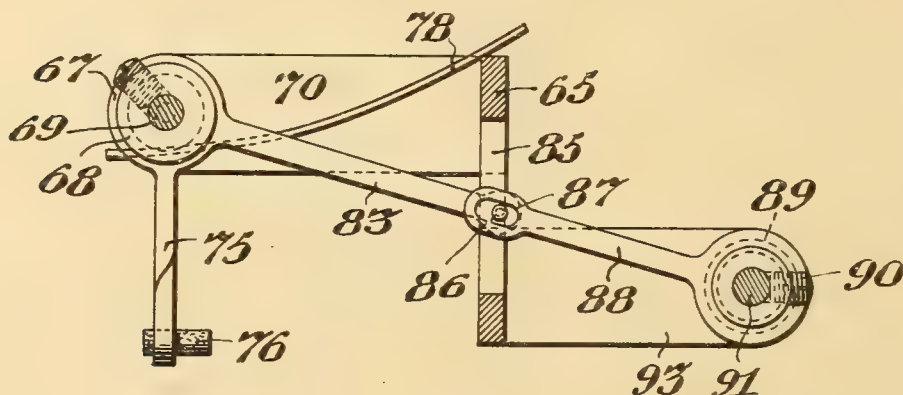


FIG. 5.

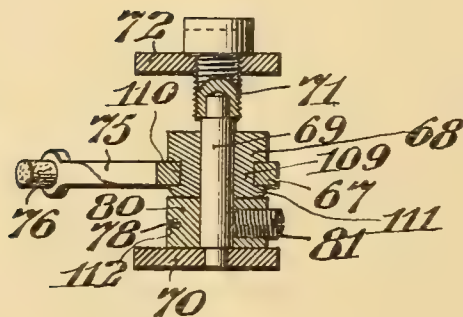


FIG. 7.

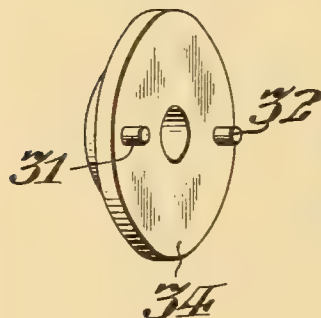


FIG. 6.

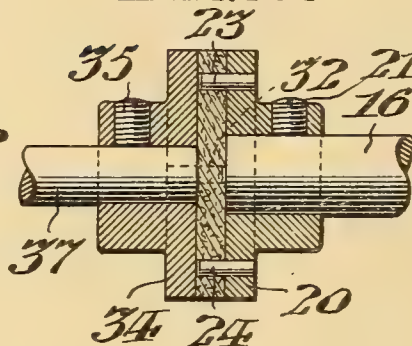
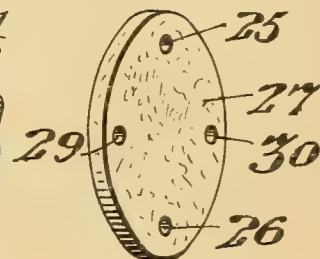


FIG. 8.



WITNESSES

Clifton C. Hallowell
Alvin B. Moulton

BY

INVENTORS
 HENRY H. MURRAY
 AND
 WILLIAM D. LA RUE,
Grace Pettit
 ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY H. MURRAY, OF RIVERTON, AND WILLIAM D. LA RUE, OF CAMDEN, NEW JERSEY, ASSIGNORS TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

COMBINED DRIVING, GOVERNOR, SPEED-REGULATING, AND SPEED-INDICATING MECHANISM FOR TALKING-MACHINES.

1,256,154.

Specification of Letters Patent.

Patented Feb. 12, 1918.

Application filed November 11, 1912, Serial No. 730,595. Renewed July 9, 1917. Serial No. 179,573.

To all whom it may concern:

Be it known that we, HENRY H. MURRAY and WILLIAM D. LA RUE, both citizens of the United States, and residents of Riverton, county of Burlington, and State of New Jersey, and city of Camden, county of Camden, and State of New Jersey, respectively, have invented certain new and useful Improvements in Combined Driving, Governor, Speed-Regulating, and Speed-Indicating Mechanism for Talking-Machines, of which the following is a specification, reference being had to the accompanying drawings.

This invention particularly relates to mechanism for indicating a predetermined constant speed, and is especially applicable to talking machines, wherein, as is well known, it is essential that the record carrying turntable be rotated at substantially the same speed at which the original of the record to be carried thereby was recorded.

The principal objects of this invention, broadly defined, are to provide talking machine mechanism including a sound record carrier having driving means adapted to be rotated at a predetermined constant speed, with simple and efficient means to indicate any deviation from the fixed speed of rotation; to provide yielding connections between the coöperative parts of said mechanism, arranged to absorb or arrest any vibrations which would tend to in any way interfere with the smooth running of the sound record carrier, or to impart a vibratory motion to the visual indicating member of the indicating means; and to provide said yielding connections with engaging means which may be disengaged by merely separating the parts.

Other objects of this invention are, to provide governing means operative to determine the speed of rotation of the coöperative parts of the talking machine mechanism; to provide means connected with the governor, operative to visibly indicate and greatly magnify a comparatively slight relative movement of the governor parts; to provide a dial-plate circularly adjustable with respect to the indicating means; and to provide means adjustable to vary the speed of said governor.

This invention specifically defined includes, with other essential talking machine elements, a sound record carrier, a governor, a motor having a yielding connection with said sound record carrier and governor, operative to absorb or arrest any vibration due to the rotation of said motor, an adjustable pad operatively supported to engage the governor disk, to determine the speed of rotation of said governor, and a speed indicator comprising a visual indicating member connected to be actuated by the movement of the governor disk, and comprising a series of loosely connected levers so correlated as to afford a relatively great movement of the visual indicating member, effected by a comparatively slight movement of the governor disk.

This invention further includes all of the various novel features of construction and arrangement hereinafter more definitely specified.

In the accompanying drawings, Figure 1 is an inverted plan view of the motor-board of a talking machine having the mechanism, including the motor, governor, speed-regulating mechanism and speed-indicating mechanism, conveniently embodying this invention, attached thereto, said parts being shown in their inoperative position; Fig. 2 is a fragmentary plan view of a portion of the motor-board and the indicating means *per se*, in operative position, the governor disk, supporting frame and turntable being indicated in dot-and-dash lines, for convenience of illustration; Fig. 3 is a side elevational view of the structure shown in Fig. 2; Fig. 4 is a plan sectional view taken on the line 4—4 in Fig. 3; Fig. 5 is a transverse vertical sectional view taken on the line 5—5 in Fig. 3; Fig. 6 is a central vertical sectional view showing the yielding connection between the motor and governor; Fig. 7 is a perspective view of the coupling member on the driving-shaft; and Fig. 8 is a perspective view of the yielding coupling member disposed between the coupling members on the driving shaft and motor shaft, respectively.

In said figures, the motor-board 10 has secured to its under surface the frame 11,

which carries the electric motor 12 and governor 13 of a talking machine. The motor 12 has the lead connections 14 and 15 and the shaft 16 mounted in suitable bearings 17 and 18 in the frame 11, said shaft 16 being provided with the coupling member 20 secured thereto by the set-screw 21, and having pins or projections 23 and 24 extending from the face thereof, in parallel relation to the axis of said shaft, as best shown in Fig. 6, into suitable apertures 25 and 26 in the coupling disk 27 formed of leather, felt, or other suitable yielding material. Said coupling disk 27 is also provided with suitable apertures 29 and 30, arranged to respectively receive the pins or projections 31 and 32 projecting from the coupling member 34, which is conveniently secured by the set-screw 35 on the driving shaft 37, which is mounted in suitable bearings 38 and 39, respectively secured in removable relation in suitable hangers depending from the frame 11, by the set-screws 41 and 42.

The driving shaft 37 carries the worm 44 in toothed engagement with the worm-gear 45 on the shaft 46 of the record carrying turntable 47, said turntable shaft 46 being suitably mounted in the bearing 48 in the frame 11, and extending freely through the motor-board 10, to support the turntable for rotation above said board.

The governor 13 comprises the hub 50 secured to an extension of the driving shaft 37 by the set-screw 51, and the hub 52 slidable axially on said shaft and connected with the hub 50 by the strap springs 53 carrying the weighted governor balls 54, which by their centrifugal action when rotated tend to shift the hub 52 axially toward the hub 50 in a well known manner. The hub 52 is conveniently provided with the circular governor disk 55, which is connected to be shifted axially with said hub, and whose axial movement toward the hub 50 is arranged to be limited when the rotation of the governor assumes a predetermined speed, by the friction pad 58, which is conveniently carried by the lever 59 on the rock-shaft 60.

The rock-shaft is suitably mounted in bearings 61 in the frame 11, and has its free end bent at an angle to its axis of oscillation, and provided with an enlargement 62 arranged to be engaged by the thumb-screw 63, having the head 64 projecting through the motor-board 10, for its convenient adjustment by the operator, to vary the rotation of the turntable to the predetermined speed suitable for the reproduction of the sound record carried by said turntable.

The speed indicator is carried by the frame or bracket 65, which is detachably secured to the frame 11, shown in Figs. 1 and 2, and comprises the bell crank lever 67, having the hub 68 secured on the pintle 69,

which has its opposite ends reduced and respectively mounted to rotate in suitable apertures in the arm 70 of the bracket 65, and the bearing screw 71, which is in threaded engagement with and adjustable relatively to the arm 72, to take up any wear of the shoulders formed by the reduced ends of the pintle 69.

The short arm 75 of the bell crank lever 67 conveniently carries at its free end the pad 76 of felt, leather, or other suitable material, which is arranged to bear against the inner face of the governor disk 55, and which is maintained in contact therewith by the spring 78, preferably formed of a normally straight piece of spring wire engaged in the collar 80, which is secured on the pintle 69 by the set-screw 81, said spring 78 having its free end engaging the frame 65, as best shown in Fig. 4.

The bell crank lever 67 is also provided with the relatively long arm 83, which is disposed in acute angular relation with respect to the short arm 75, and which extends through an opening 85 provided therefor in the bracket 65. The lever arm 83 is provided at its free end with the pin or projection 86 extending loosely into the slot 87 in the relatively short lever 88, having the hub 89 secured by the set-screw 90 on the shaft 91 of the indicator pointer 92, it being noted that the width of the slot 87 in the lever 88, as best shown in Fig. 4, is slightly wider than the diameter of the projection 86, which is arranged to be engaged by the walls of said slot, whereby any unavoidable inequalities in the governor disk 55 which may tend to vibrate the bell crank lever 67 in an oscillatory manner, will be compensated for by the slight play and relative movement of the arm 83 and the lever 88, so that, as will be observed, such unavoidable oscillation of the bell crank lever 67 will not be imparted to the shaft 91, and, consequently, to the visual pointer 92.

The shaft 91 is conveniently mounted to oscillate in the bearings in the arms 93 and 94 of the bracket 65, and extends freely through the aperture 95 in the motor-board 10. Said shaft 91 has its upper end reduced to form the shoulder 97, with which the hub 98 of the pointer 92 engages, said pointer 92 being secured in rotatably adjusted relation on said shaft and being counterbalanced by a rearwardly extending tail-piece 99 having an enlarged counterweight 100.

The shaft 91 is maintained axially adjusted by the collar 102, secured thereon by the set-screw 103 and maintained in frictional contact with the arm 94 of the bracket 65 by the spring 105, which is interposed between the hub 89 of the lever 88 and the arm 93 of said bracket 65.

It will be readily seen that any axial

movement of the governor disk 55 will effect oscillation of the bell crank lever 67, which will impart through the short arm 75 and long arm 83 of the bell crank lever 67 and the short lever 88 and shaft 91 a movement of the pointer 92 of considerably greater magnitude than the axial movement of the governor disk 55, and thereby visibly indicate on the face of the dial-plate 107, which is provided with graduations 108, any deviation either slow or fast from the predetermined speed of rotation of the governor, and consequently the predetermined speed of rotation of the turntable, which is directly connected with said governor.

Referring to Fig. 5, it will be seen that the bell crank lever 67 is provided with a hub 68, which is connected therewith by slipping its shank 109 through a suitable aperture 110 in said bell crank lever and upsetting the outer free end of said shank 109, as shown at 111, it being noted that the hub 89 is secured to the lever 88, and the hub 98 is conveniently secured to the pointer 92 in a similar manner.

Again referring to Fig. 5, it will be seen that the spring 78 is conveniently connected with the collar 80 by being inserted in a saw-cut or like slot 112, the walls of which are subsequently upset to prevent the accidental displacement of said spring from said collar.

As best shown in Fig. 2, the dial-plate 107 is provided with slots 115 and 116 at its opposite ends, through which the securing screws 118 and 119 extend, the major axes of said slots being substantially coincident with an arc whose center is coaxial with the axis of rotation of the turntable, whereby said plate may be adjusted to register its central or neutral graduation 120 with the pointer without changing the relation of the talking machine mechanism within the casing.

The mechanism above described operates as follows: The normal speed at which the turntable carrying the sound record disk is to rotate being determined, the speed regulator is adjusted by the rotation of the thumb-screw 63 to set the friction-pad 58 in position to limit the axial movement of the governor disk 55, and the pad 76 of the speed-indicating mechanism so positioned in the arm 75 of the bell crank lever 67 that when its engaging surface is in a plane with the surface of the pad 58, the pointer 92, which may be rotatably adjusted on the shaft 91, registers with the central scratch or line 120 of the graduations 108 on the dial-plate 107.

The speed-regulating and speed-indicating parts being thus adjusted, the current may be supplied to the motor 12, which effects rotation of the motor-shaft 16, and a consequent rotation of the driving-shaft 37

through the resilient coupling comprising the coupling members 20 and 34 and the interposed yielding disk 27, which tends to absorb or arrest any vibrations or uneven rotation of the motor and thereby refines the power to such an extent as to effect a rotation of the driving-shaft 37 free from variation or vibration.

Such even rotation of the driving-shaft 37 affords a continuous engagement of the operative working surfaces of the worm 44 and its worm-gear 45 on the shaft 46 of the turntable 47, so that a smooth continuous and unvariable rotation of the turntable is effected, which is highly essential in talking machine mechanism, wherein, as is well known, any vibration not caused by the reproducer has undesirable effects upon the reproduction of the record, and any variation caused by a jerking or uneven motion of the turntable, although the difference of speed may not be visible, greatly impairs the relative pitch of the successive sounds or tones reproduced by the record.

The rotation of the driving-shaft 37 effects, through the centrifugal action of the governor weights or balls 54, an axial movement of the governor disk 55 toward the engaging surface of the pad 58, by which said axial movement is limited.

Such axial movement of the governor disk effects a rocking movement of the bell crank lever 67 in opposition to the tension of the spring 78 from the position shown in Fig. 1 to the position shown in Fig. 2, by the engagement of said disk with the pad 76 in the short arm 75; the long arm 83 of said bell crank lever being loosely connected with the relatively short lever 88, which is secured to the shaft 91 of the comparatively long pointer 92, produces a greatly magnified movement of the point of the pointer over the graduations 108 on the dial-plate 107.

In assembling the talking machine parts, the pad 76 is so inserted that when the desired speed of the record carrying turntable 47 is attained, the pointer 92 will register with the central or neutral graduation scratch or line 120 on the dial-plate 107, when said plate is so disposed that the securing screws 118 and 119 extend centrally through their respective slots 115 and 116. It will be seen that should the pointer 92 from any cause, such as is due to wear, or from possible warping of the motor-board, fail to properly register with the graduation corresponding to the speed of the turntable which said graduation is intended to indicate, said plate may be adjusted, when the screws 118 and 119 are loosened, within the range of circular movement afforded by the slots 115 and 116, to a position to properly register its graduations with the pointer 92 in accordance with the speed of the turntable 47.

It may be here noted that by the coöperative effect of the resilient connection between the motor 12 and governor 13, and the loose connection between the lever 88 and arm 83 of the bell crank lever 67, any unavoidable vibrations due to inequalities of the running of the motor, or any inaccuracies in assembling the parts, are absorbed or arrested within the mechanism and thereby prevented from being imparted to the visual indicator pointer 92.

It will be obvious that a coupling constructed in accordance with this invention provides a yielding connection which affords a slight rotary play to prevent any slight and sudden variation in the natural rotation of the motor from being transmitted to the driving-shaft, whereby an even rotation of the turntable and governor and the parts connected therewith will be effected, and, consequently, any undue strain thereon prevented.

Furthermore, it will be seen that the fitting of the parts in assembling is greatly facilitated, owing to the fact that the absolute alinement of the motor-shaft and the governor-shaft is not required, and that by the employment of such construction and arrangement of the parts, said shafts and the respective parts carried thereby may be readily separated and removed by merely drawing the abutted ends of the shafts apart.

It may also be observed that the speed-indicating mechanism is positively actuated by mechanical transmission, providing means directly connected with the governor disk, which is primarily shifted by the centrifugal action of the governor weights or balls, and that the transmission means bearing directly upon the governor disk affords but slight friction to be overcome, and being always in contact therewith effects a quick action of the indicator pointer.

Moreover, by reason of the relative length of the long pointer 92 and its connected relatively short lever 88, and the comparatively long and short arms 83 and 75 of the bell crank lever 67, respectively connected with the lever 88 and engaging the governor disk 55, a comparatively slight axial movement of said governor disk effects a greatly magnified movement of the speed-indicating pointer over the graduations 108 of the dial-plate 107.

It may be here stated that when the parts of the indicator mechanism have been assembled and the position of the governor disk 55 determined, the pointer 92 may be rotatably adjusted on the shaft 91, to register its point with the scratch line 120 of the graduations 108.

It is not desired to limit this invention to the precise details of construction and arrangement herein set forth, as various modi-

fications may be made therein without departing from the essential features of the invention as defined in the appended claims.

Having thus described our invention, we claim:

1. In mechanism of the class described, the combination with a rotary member, of a driving-shaft, a governor having means movable axially in accordance with the speed of rotation of said shaft, a speed-indicator, a lever having one end in engagement with the movable governor member, and the other end loosely connected to actuate said speed-indicator, and having a slight relative play with respect thereto, to compensate for any vibration or inequalities in the rotation of the movable governor member, and means operatively connected to rotate said driving-shaft.

2. In a speed indicator, the combination with a governor having a member the position of which is determined by the speed of rotation of said governor, of a pivoted lever in engagement with said movable member, a second pivoted lever, and a pointer operated by said second lever, one of said levers being provided with a slot and the other of said levers being provided with a projection loosely fitting into said slot whereby minute changes in the position of said governor member are not transmitted from said first lever to said second lever and to said pointer.

3. In mechanism of the class described, the combination with a rotary member, of a driving-shaft operatively connected to rotate said rotary member, means movable in accordance with the speed of rotation of said driving-shaft, an oscillatory speed-indicator, a shaft for said speed-indicator, a frame providing suitable bearings for said shaft, a lever on said shaft having an elongated slot in its free end, a bell crank lever having one arm engaged with said movable member and the other arm provided with a projection extending into said slot, of less diameter than the width of said slot, an adjusting screw in said frame providing a bearing, a pintle for said bell crank lever having a trunnion supported in said frame, and a trunnion supported in the bearing in said adjusting screw.

4. In mechanism of the class described, the combination with a rotary member, of a driving-shaft operatively connected to rotate said rotary member, a governor having a member movable in accordance with the rotation of said driving-shaft, a speed-indicator, a shaft for said speed-indicator, a frame having suitable bearings for said shaft, a lever on said shaft having an elongated slot in its free end, a bell crank lever having one arm provided with a projection extending into said slot, and being of less diameter than the width of said slot, an adjustable pad in the other arm in engage-

ment with the movable governor member, an adjustable screw in threaded engagement with said frame, providing a bearing, a pintle for said bell crank lever, supported at one end in said frame and at the other end in the bearing in said adjustable screw, and a spring secured to said pintle tending to press said adjustable pad into engagement with said movable governor member.

5. In mechanism of the class described, the combination with a rotary member, of a driving-shaft operatively connected to rotate said rotary member, a governor having a member movable in accordance with the rotation of said driving-shaft, a speed-indicator, a shaft for said speed-indicator, a frame having suitable bearings for said shaft, a lever on said shaft having an elongated slot in its free end, a bell crank lever having one arm provided with a projection extending into said slot, and being of less diameter than the width of said slot, an adjustable pad in the other arm in engagement with the movable governor member, an adjusting screw in said frame, providing a bearing, a pintle for said bell crank lever supported at one end in said frame and at the other end in the bearing in said adjusting screw, a spring secured to said pintle tending to press said

adjustable pad into engagement with said movable governor member, and a dial-plate having graduations for said indicator, and provided with slots through which securing means may be extended to permit adjustment of said dial-plate with respect to said speed-indicator.

6. In mechanism of the class described, the combination with a rotary member, of a driving shaft, a governor having a member movable in accordance with the speed of rotation of said driving shaft, a rock shaft, a lever secured to said rock shaft having its free end slotted, a pointer carried by said rock shaft and adjustably secured thereon, a pivoted lever having means on one end engageable with said movable governor member and having a projection on the other end loosely engaged in the slot of said slotted member.

In witness whereof, we have hereunto set our hands this 8th day of November, A. D. 1912.

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WILLIAM D. LA RUE.

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JOHN D. MYERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

AUTOMATIC STOP FOR PHONOGRAPHS.

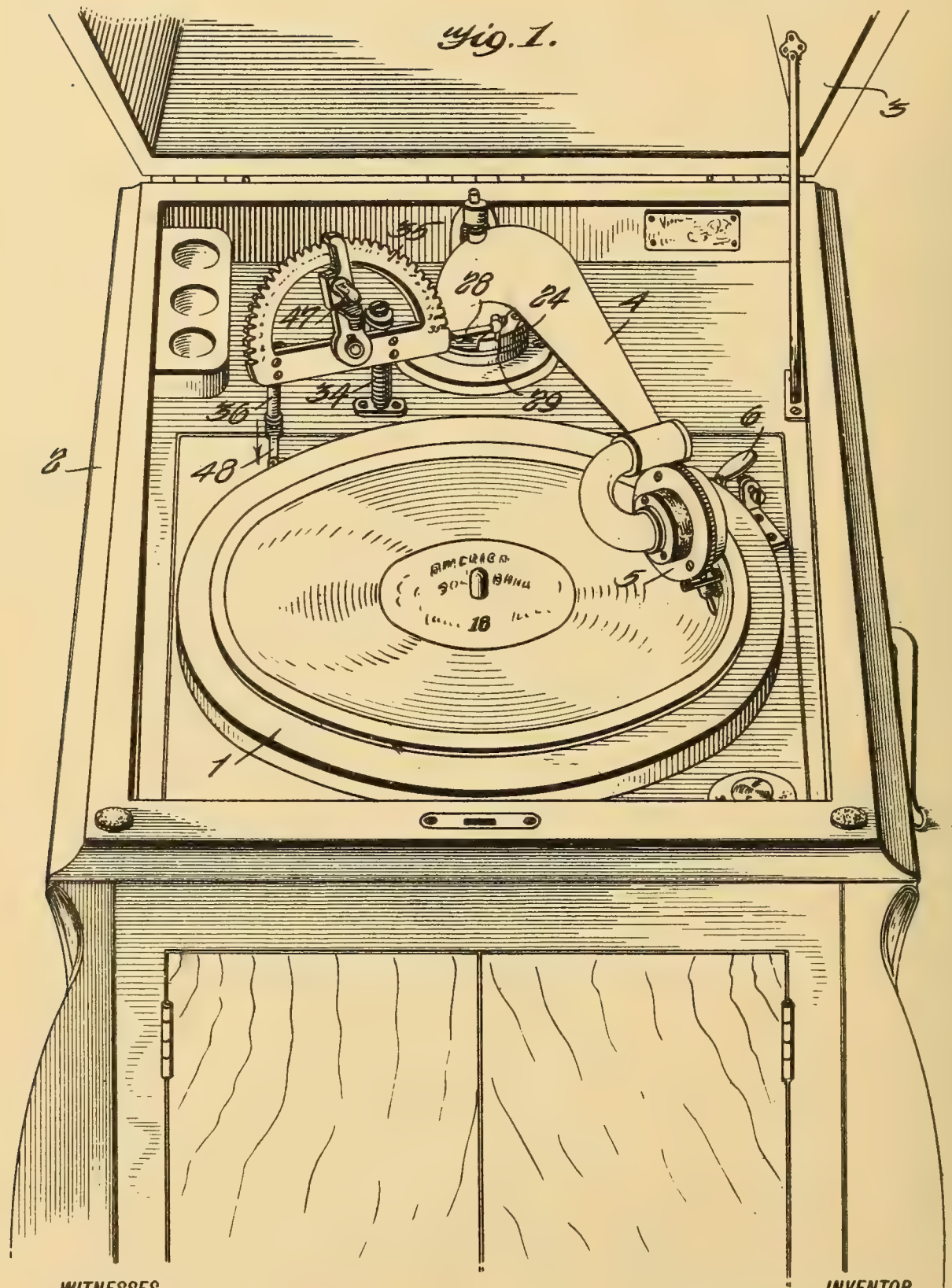
1,256,317 ----- A. C. Hendricks,
Patented Feb. 12, 1918,
Filed Aug. 16, 1917.

A. C. HENDRICKS.
 AUTOMATIC STOP FOR PHONOGRAPHS.
 APPLICATION FILED AUG. 16, 1917.

1,256,317.

Patented Feb. 12, 1918.

4 SHEETS—SHEET 1.



WITNESSES

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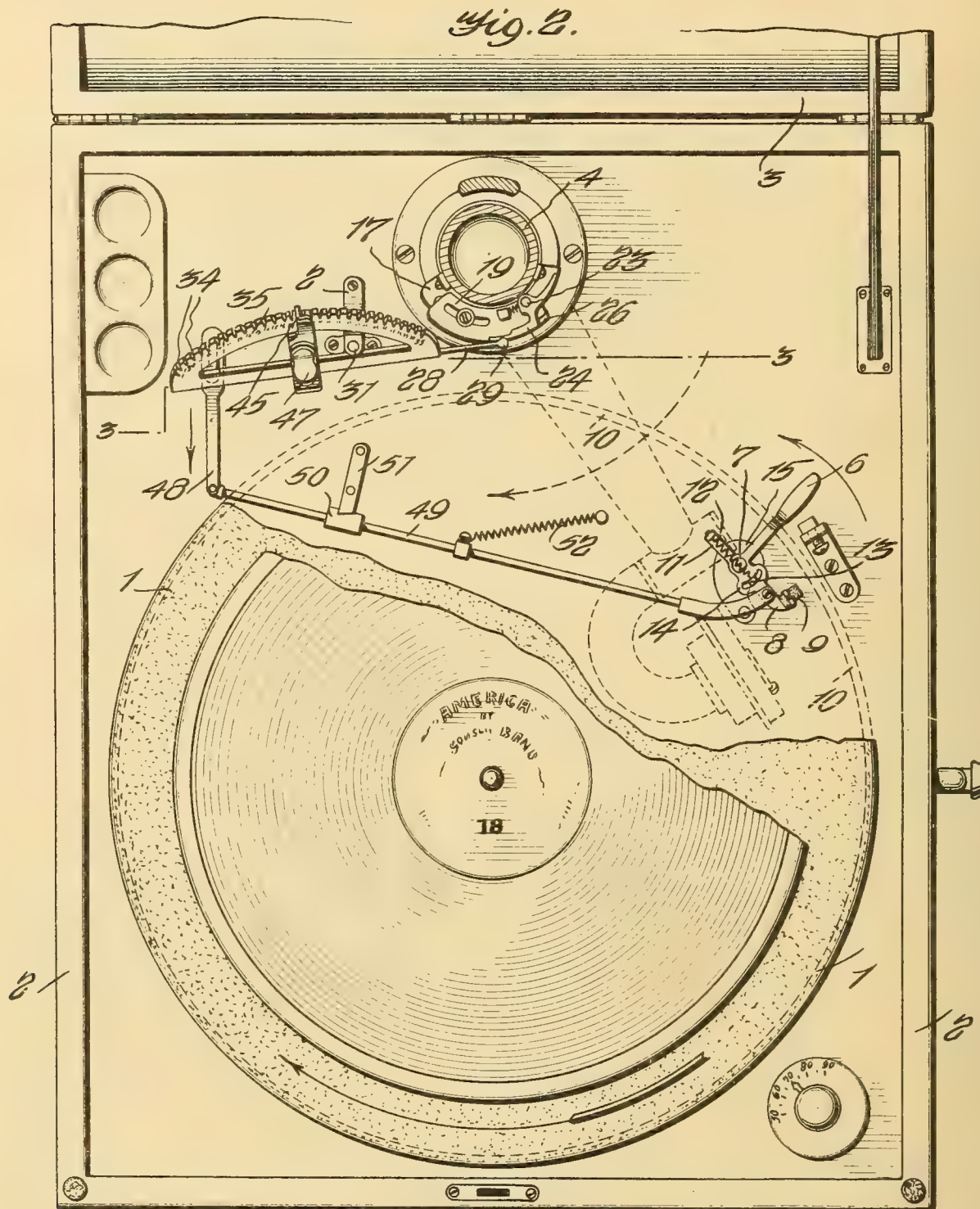
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4 SHEETS—SHEET 2.



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1,256,317.

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4 SHEETS—SHEET 4.

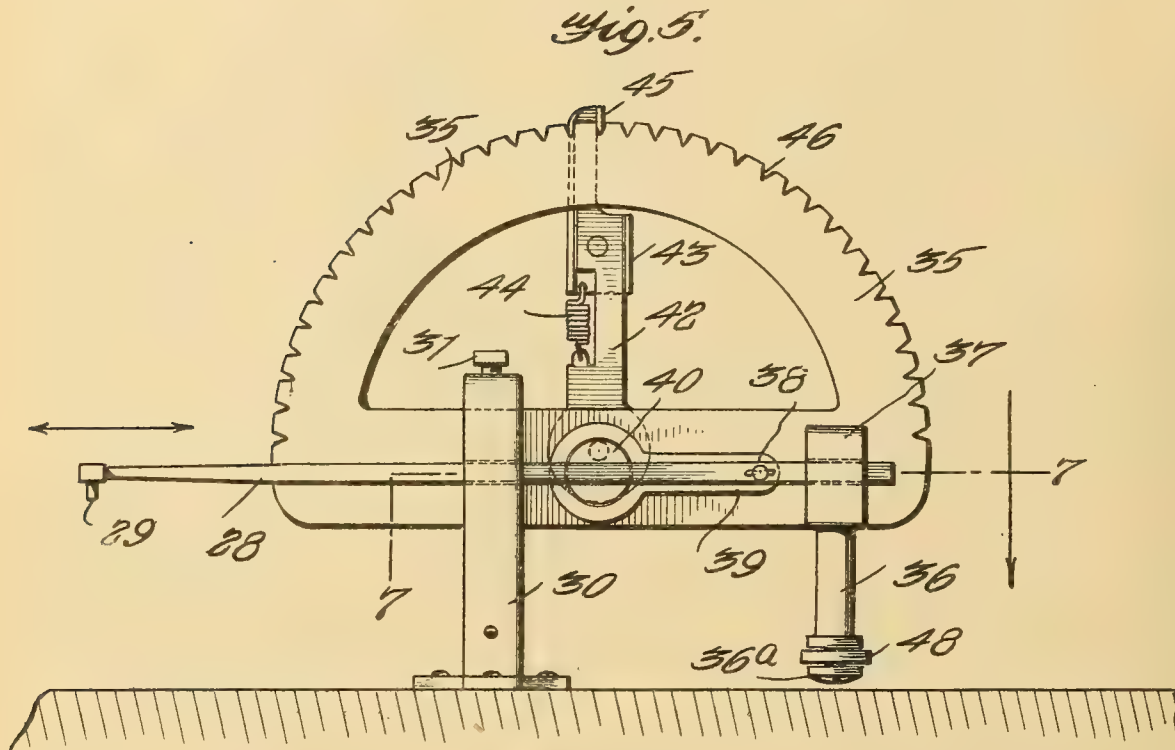


Fig. 6.

Fig. 7.

Fig. 8.

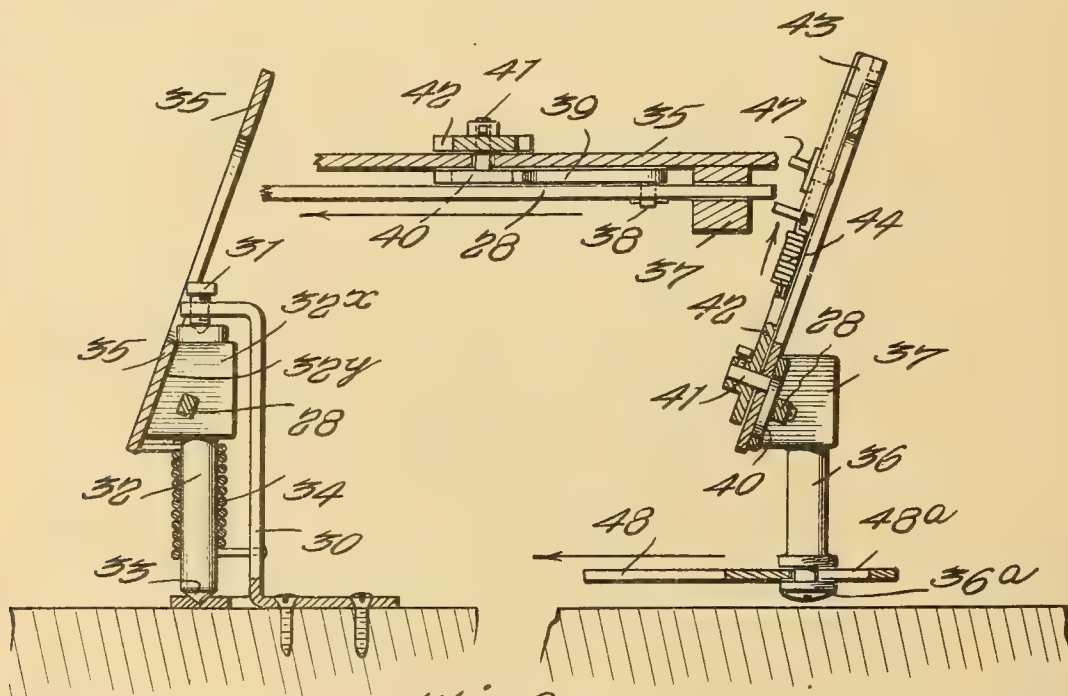


Fig. 9.



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AUTOMATIC STOP FOR PHONOGRAPHS.

1,256,317.

Specification of Letters Patent.

Patented Feb. 12, 1918.

Application filed August 16, 1917. Serial No. 186,550.

To all whom it may concern:

Be it known that I, ADAM C. HENDRICKS, a citizen of the United States, and a resident of Martinsburg, in the county of Berkeley and State of West Virginia, have invented a new and useful Improvement in Automatic Stops for Phonographs, of which the following is a specification.

My invention relates to improvements in automatic stop for phonographs, and consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide an automatic stop which is comparatively simple in its structure, but which may be accurately set to stop the machine at the end of a record whether the record be a short one or a long one.

A further object of my invention is to provide an automatic phonograph stop which is actuated by the movement of the tone arm and which does not depend upon the closure of an electric circuit.

A further object of my invention is to provide a device having a dial and a pointer which may be set at any place on the dial to correspond with a given record so as to cause the stopping of the device immediately after the end of the record has been reached.

A further object of my invention is to provide a stopping device which may be used in connection with the ordinary brake such as that used on phonographs of the disk type in which the brake engages an edge of the turn-table.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application, in which:

Figure 1 is a perspective view of a disk-phonograph with my improved stop mechanism applied thereto.

Fig. 2 is a plan view of the device, a portion of the turn-table being broken away to show the brake mechanism.

Fig. 3 is a section along the line 3—3 of Fig. 2.

Fig. 4 is a section along the line 4—4 of Fig. 3.

Fig. 5 is a rear view of the dial.

Fig. 6 is a section along the line 6—6 of Fig. 3.

Fig. 7 is a section along the line 7—7 of Fig. 5.

Fig. 8 is a section along the line 8—8 of Fig. 3.

Fig. 9 is a detailed view of an eccentric.

As stated before, the invention is designed primarily for disk machines which have a rotatable table for disk records. In Fig. 1 the rotatable carrier or table 1 is shown as disposed in a cabinet 2 having a hinged cover 3. The tone arm 4 and the sound reproducer 5 are of the usual type. The invention is designed to be used in connection with the ordinary brake which is used with the machine to start and stop the table, the starting being accomplished by the release of the brake, and the stopping by the application of the brake to a portion of the table. In Fig. 2 I have shown the brake handle 6 which is pivotally mounted at 7 and which bears an arm 8 having a resilient buffer 9 arranged to engage a downwardly extending peripheral flange 10 of the table 1. The handle 6 has an arm 11 extending in the opposite direction from the arm 8. The end of the arm 11 is connected by means of a spring 12 with a pin 13 disposed in a slot 14 in the arm 8. The pivot 7 is mounted on a plate 15 which may be secured to the top of the cabinet in position to stop the wheel when the handle 6 is moved. This construction is ordinary; any other spring brake of the general type described might be used in connection with my automatic stopping mechanism.

In connection with an instrument such as I have described in brief, I make use of a novel combination of elements so as to render the brake automatic, this automatic action being controlled by the movement of the tone arm. To this end, I arrange a plate 17 on the vertical part of the tone arm 4 near the pivotal support of the latter. The plate 17 is secured to the tone arm by means of screws which pass through ears 18. Adjus- tably disposed on the plate 17 is an arc-shaped plate 19 which is provided with a slot 20 and a set-screw 21 arranged to pass through the slot 20 and through openings 22

in the plate 17. The set screw may be tightened so as to secure the plate 19 to the plate 17 at various positions around the tone arm 4. It will be understood that when a desirable position is reached the set screw 21 is tightened so as to keep the plates 17 and 19 in fixed relation.

Pivotally mounted on the plate 19 at 23 is a guide member 24 which has an arc-shaped edge 25 contiguous to an arc-shaped edge 26^x of a lug 26 carried by the plate 19, these arcs being on a circle of which the axis of the tone arm is the center. A spring 27 normally holds the guide member 24 in engagement with the lug 26. An arm 28 bears a pin 29. This arm 28 is movable and is under spring tension, as will be explained later, and the pin 29 rides along the guide member 24 and past the lug 26 then swings inwardly, when the movement of the tone arm is in the direction indicated by the arrow in Fig. 4. When the tone arm is moved in the opposite direction the pin 29 engages the surface 25^x of the pivoted guide member 24 and turns the latter on its pivot while the pin glides along the inclined surface 25^x until it reaches the arc-shaped surface 25, passing between the guide member 24 and the lug 26. Immediately after the pin has passed through the opening the guide member swings back into the position shown in Fig. 4. The arm 28 controls the brake member through a mechanism hereinafter described.

At 30, see Figs. 2, 3, 5 and 6, I have shown a Z-shaped bracket bearing a pivot screw 31 for a pivot rod 32 whose lower end has a cone shaped portion arranged to enter a socket in a plate 33 so that the pivot rod 32 may be turned on its axis. A spiral spring 34 has one end secured to the bracket 30, the other end being secured to the lower part of a semi-circular dial plate 35. This dial plate is secured to an enlarged portion 32^x of the pivot post 32 along a side 32^y which is inclined to the vertical as clearly shown in Fig. 6. Near the opposite end of the dial, I secure a post 36 by means of a head 37 which is somewhat similar to the head 32^x. The bar or rod 28 passes through both the heads 32^x and 37, being slidably disposed with respect to these two heads. It is pivotally connected at 38, see Fig. 5, with an arm 39 secured to an eccentric 40 which has a shaft 41, see Figs. 5, 7 and 8, which passes through the dial plate 35 and to which is secured an arm 42. The latter bears a slidable locking plate 43 which is normally held by a spring 44 in such a position that its bent upper end 45 engages one of a number of notches 46 in the dial plate 35 to hold the arm in position. A thumb piece 47 is provided, by means of which the slidable locking member 43 may be lifted so as to permit the arm 42 to be moved to various

positions along the dial, these positions being indicated by numerals which register with the respective notches 46.

The lower end of the post 36 is provided with a screw 36^A which passes through a slot 48^A and an arm 48. This is pivotally connected with a link 49 which has a detent 50 arranged to engage a stationary stop 51 on the top of the case. A spring 52 is secured to the link and exerts tension thereon when the link is in the position shown in Fig. 2. The opposite end of the link is pivotally connected with the arm 8 of the brake mechanism.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

When a record is first played, it is put on the turn-table in the ordinary manner and the needle is brought to the center of the record and placed just inside of the last convolution of the spiral groove on the record. The locking plate 43 of the arm 42 is now released and the arm 42 is moved. This moves the bar 28 through the medium of the eccentric 40 and link 39. The arm 42 is turned until the pin 29 passes the end of the lug 26, see Fig. 4. The spiral spring 34 will cause the arm 28 to swing inwardly. The arm 42 is now set at the place it was on the dial when the pin first cleared the lug. Let us assume that this place is marked 18 on the dial, as shown in Fig. 3. The record is now marked with the figure 18. Another record is now tested, and it may be found that the arm 42 has to be set at 12 in order for the pin 29 to clear the lug 26 when the needle is just inside the last convolution of the spiral groove on the record. This record is then marked 12; similarly the other records are marked.

Now, when a record is played, it is only necessary to look at the numeral on the record, as for instance, 18, and set the arm 42 at 18 on the dial. The tone arm is now brought out to the beginning of the record and the brake handle 6 is released. The movement of the tone arm out to its initial position brought the pin 29 into the position shown in Fig. 2, while the movement of the brake handle to the releasing position as shown in Fig. 2 started the turn-table in the ordinary manner and brought the link with its detent 50 into locking position with the stop member 51. It also pushed the arm 48 so as to bring the screw 36^A at one end of the slot 48^A, see Fig. 8.

The record is now being played and the tone arm is swinging inwardly in the usual manner. The guide member 24 together with the lug 26 are turning, that is to say, are rotating past the pin 29. As soon as the pin clears the lug 26, the spring 34 will cause the arm 28 to swing inwardly, forcing the arm 48 outwardly, moving the link so as

to disengage the detent 50, whereupon the spring 52 will pull the link and with it the arm 8 of the brake spring mechanism, into the stopping position; that is to say into frictional contact with the flange 10 of the turn-table, thus stopping the movement of the latter.

I claim:

1. The combination with a disk phonograph having a friction brake and a movable tone arm, of a guide member carried by the tone arm, a spring pressed bar normally held against the guide member and adapted to clear the latter during the movement of the tone arm, connections between said brake and said bar for setting the brake when the bar has cleared the guide member, and means for adjusting the position of the bar with respect to the end of the guide member so as to vary the point at which the bar clears the guide member.

2. The combination with a disk phonograph having a friction brake and a movable tone arm, of a guide member consisting of a movable part and a fixed part, said movable part being arranged to engage said fixed part when the tone arm is moving from the outer to the inner portion of the record, a spring pressed bar having a pin arranged to slide on said guide members and to clear said guide members during the movement of the tone arm from the outer to the inner portion of the record, and means for communicating the movement of the bar to the brake mechanism to set the latter.

3. The combination with a disk phonograph having a friction brake and a movable tone arm, of a guide member consisting of a movable part and a fixed part, said movable part being arranged to engage said fixed part when the tone arm is moving from the outer to the inner portion of the record, a spring pressed bar having a pin arranged to slide on said guide members and to clear said guide members during the movement of the tone arm from the outer to the inner portion of the record, means for communicating the movement of the bar to the brake mechanism to set the latter, and means for shifting the position of the bar and its pin toward and away from the stationary part of the guide member.

4. The combination with a disk phono-

graph having a friction brake and a movable tone arm, of a guide member consisting of a movable part and a fixed part, said movable part being arranged to engage said fixed part when the tone arm is moving from the outer to the inner portion of the record, a spring pressed bar having a pin arranged to slide on said guide members and to clear said guide members during the movement of the tone arm from the outer to the inner portion of the record, means for communicating the movement of the bar to the brake mechanism to set the latter, means for shifting the position of the bar and its pin toward and away from the stationary part of the guide member, said means comprising a disk, an eccentric carried by the disk, means connecting said eccentric with said bar for moving the latter, and a handle connected with the eccentric and arranged to move over the face of the disk.

5. The combination with a disk phonograph having a friction brake and a movable tone arm, of a guide member consisting of a movable part and a fixed part, said movable part being arranged to engage said fixed part when the tone arm is moving from the outer to the inner portion of the record, a spring pressed bar having a pin arranged to slide on said guide members and to clear said guide members during the movement of the tone arm from the outer to the inner portion of the record, means for communicating the movement of the bar to the brake mechanism to set the latter, means for shifting the position of the bar and its pin toward and away from the stationary part of the guide member, said means comprising a disk, an eccentric carried by the disk, means connecting said eccentric with said bar for moving the latter, a handle connected with the eccentric and arranged to move over the face of the disk, and locking means for said handle, consisting of a series of notches disposed on the face of the disk, and spring means carried by the handle and arranged to enter the notches.

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Witnesses:

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TALKING MACHINE BRAKE.

1,256,601 ----- C. O. Scott,
Patented Feb. 19, 1918,
Filed July 12, 1917.

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TALKING MACHINE BRAKE.
APPLICATION FILED JULY 12, 1917.

1,256,601.

Patented Feb. 19, 1918.

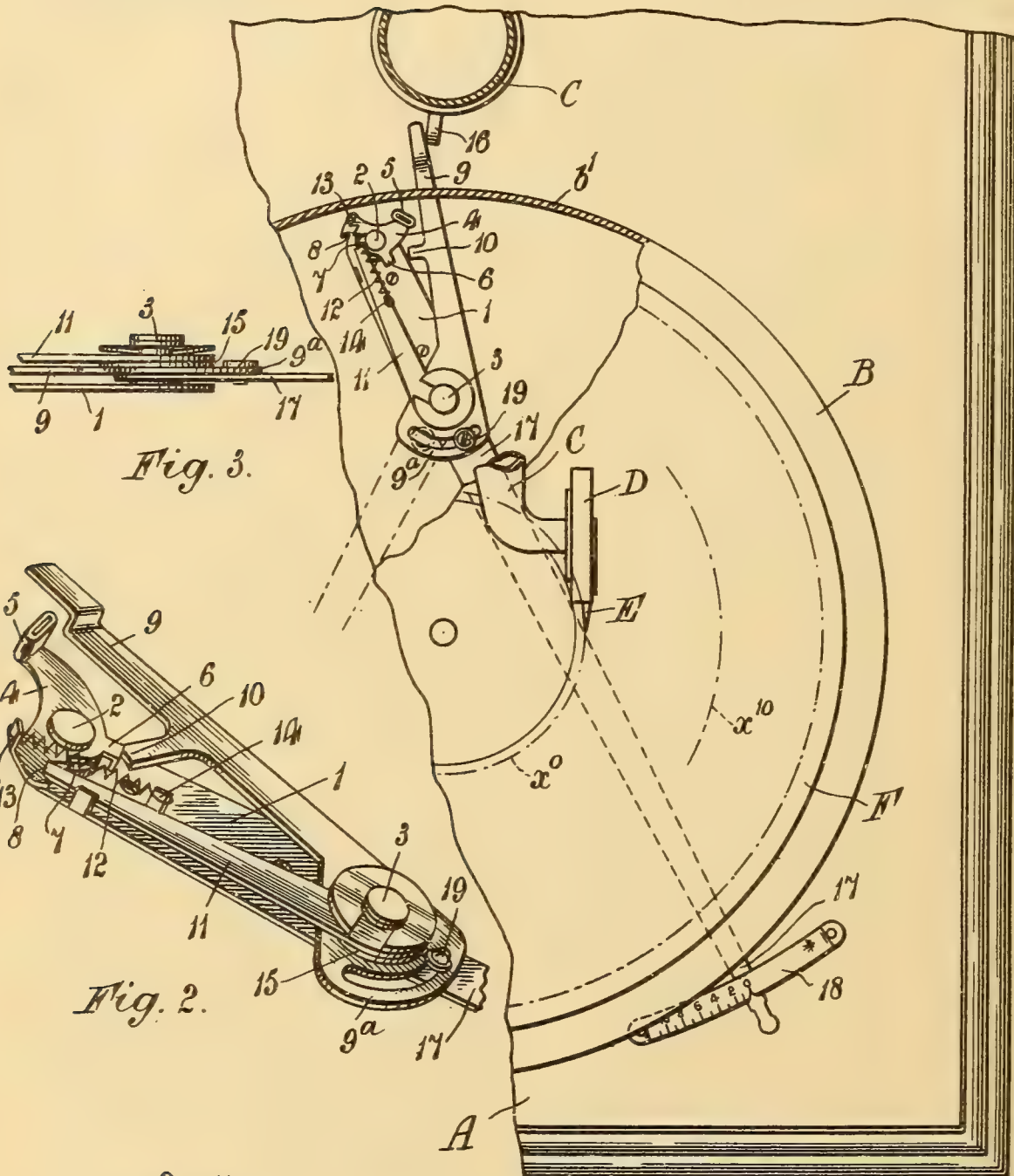


Fig. 3.

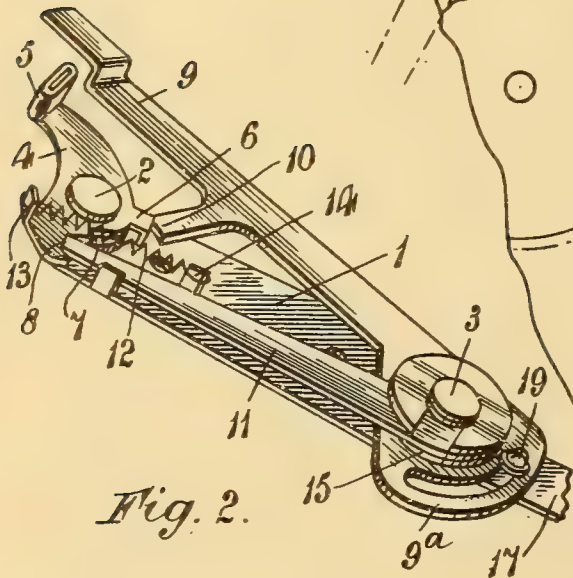


Fig. 2.

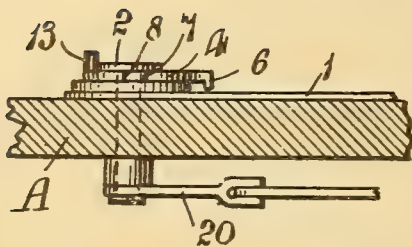


Fig. 4.

Fig. 1.

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UNITED STATES PATENT OFFICE.

CHARLES O. SCOTT, OF TORONTO, ONTARIO, CANADA, ASSIGNOR TO SCOTT MANUFACTURING COMPANY, OF TORONTO, ONTARIO, CANADA.

TALKING-MACHINE BRAKE.

1,256,601.

Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed July 12, 1917. Serial No. 130,125.

To all whom it may concern:

Be it known that I, CHARLES O. SCOTT, of the city of Toronto, in the county of York, in the Province of Ontario, in the Dominion
5 of Canada, manufacturer, have invented certain new and useful Improvements in Talking-Machine Brakes, and do hereby declare that the following is a full, clear, and exact description of same.

10 This invention relates to talking machine brakes of the type adapted to control the starting and effect the automatic stopping of the rotation of a record carrying member of a talking machine, such for example as
15 the type of brake referred to in my prior United States Letters Patent Number 1,203,418, granted to me on the 31st day of October, 1916; and has for its object to increase the applicability of such devices by
20 providing for the variable adjustment of an operating lever with respect to the brake mechanism, or certain parts of the said brake mechanism, whereby the normal position on the machine of the said operating
25 lever can be variably determined to suit the conditions under which the brake mechanism may be employed, with the result that the said brake mechanism may be applied to talking machines of various types and in
30 various localities thereon, without requiring change in the design of the mechanism to suit the particular machine.

Further objects subsidiary to or resulting from the above mentioned main object or
35 from the construction of the invention as it may be carried into effect will become apparent as the said invention is further disclosed hereinafter.

The invention may be carried into effect
40 by the provision in combination with a brake releasing member, or members, adapted to automatically operate at a predetermined period in the operation of the talking machine, when a record is being reproduced, of a lever having for its purpose to
45 effect the manual control directly or indirectly of the said releasing member as may be required to so determine the period in the operation of the machine at which the brake is to be applied, the said lever being normally operably associated with the said
50 brake releasing member by virtue of suitable locking or connecting means, which locking or connecting means may be temporarily released to permit the independent movement

and adjustment of the said operating lever, without affecting the position of the said releasing member; so that the relative positions of said member and lever one to another, may be varied when and as desired; all of which is more particularly described
60 and ascertained in and by the following specification having reference to the accompanying drawing, by way of example, in which—

Figure 1, is a plan view of a disk talking machine, partly broken away, the turn table being also still further broken away to indicate part of the rim thereon in section, the application of this invention to the machine
65 being illustrated.

Fig. 2, is a detail perspective view, partly broken away, illustrating the brake mechanism detached from the machine.

Fig. 3, illustrates the relative positions of
75 the certain members of the said brake mechanism one above the other upon a common pivot, and

Fig. 4, is a detail view illustrating a method of arranging the brake mechanism
80 to operate upon the motor or such mechanism within the motor casing.

Similar characters of reference indicate similar parts in the several figures of the drawing and Figs. 2, 3 and 4 are drawn to a
85 larger scale than Fig. 1 of the said drawing.

A indicates the motor casing of a disk talking machine, B being the turn-table, C, C the sound arm, and D the reproducer, provided with the needle E; F illustrating
90 a disk record upon the said turn-table B. The nature and variety of these parts are well known and, therefore, do not call for further description herein.

In the example, the turn-table B is provided with a downwardly extending rim b^1 , against which the brake acts to normally prevent rotation of the turn-table.

The brake mechanism illustrated is situated beneath the turn-table B and comprises base plate 1, secured to the motor casing and provided with a pivot 2, at its outer end, and a further pivot 3 at its inner end, the pivot 2 rotatably carrying a brake member 4, which member is provided with a rubber 5, suitably mounted thereon, a lug 6, and is peripherally notched at 7 and 8.

9 is a trip arm, capable of angular movement about the pivot 3, and provided with
110

a laterally projecting brake releasing arm or extension 10, the extremity of which is adapted, by its relative position, to contact with the lug 6 upon the brake member 4, when the said trip arm 9 is moved there-
toward to a sufficient extent, so that move-
ment of the said trip arm 9 toward the
pivot 2, to a desired extent, would result in
the rotation of the said brake member 4
about its supporting pivot 2, and the re-
sultant withdrawal of the rubber 5 from
contact with the rim b^1 of the turn-table B.

11 is a pawl arm also mounted on the said
pivot 3, the free or outer end of which pawl
arm is held in contact with the notched pe-
riphery of the brake member 4 and engages
with the notch 8, when the said brake is
in its operative position but may be brought
into engagement with notch 7 upon the rota-
tion of the said brake member, as result of
pressure of the releasing arm 10 against the
lug 6, the movement of the pawl arm 11,
to so engage the notch 7, being effected by
a tensioned spring 12, connecting projections
13 and 14 upon the brake member 4 and the
pawl arm 11 respectively, and against the
action of which spring the brake member 4
is rotated by the releasing arm 10.

The trip arm 9 and pawl arm 11 are fric-
tionally engaged, a friction washer 15 being
shown on the drawing, so that the said arms
9 and 11 have a tendency to maintain their
angular relation, which relation may be va-
ried by overcoming such friction which is
not necessarily very great.

The sound arm C carries a trip 16, the
position of which varies in accordance with
the position of the needle E upon the record
so that, as the needle E moves toward the
center of the record, as is usually the case
with disk records, the trip 16 will move in
the same direction. It will be seen that the
brake mechanism is so located that the trip
arm 9 extends across the path of the trip 16.

17 is an operating lever by which the said
trip arm 9 may be manually adjusted, the
outer end of the said lever suitably register-
ing with the graduated plate 18, and this
lever is rigidly connected with the trip arm
9. It, therefore, follows that the movement
of the operating lever in one or another
direction, around the pivot 3, will result in
a corresponding movement of the said trip
arm and the relation of the parts is such
that, in the example illustrated in Fig. 1,
where the operating lever 17 registers with
the graduation 0 on the plate 18, the trip
arm 9 assumes a position adapted to be en-
gaged by the trip 16 at that period in its
travel when the needle E is located on an
inner groove indicated by the line x^0 as
shown on the drawings; whereas, if the
lever 17 registers with the graduation 10
on the said plate 18, then the position of
the trip arm 9 would be such that contact

between the trip 16 and the said arm would
ensue when the needle E had only traveled
inwardly as far as the groove indicated by
the line x^{10} . Similarly the movement of the
lever 17 until it registers with the asterisk
at the outer end of plate 18, would effect the
movement of the trip arm 9 in a direction,
and to an extent, whereby the trip releasing
arm 10 would contact with the lug 6 and
rotate the brake member 4 until the pawl
arm engages with the notch 7 on the pe-
riphery of the said brake member, and so
lock the said brake member in its inopera-
tive position, permitting the rotation of the
turn-table.

It will be understood that when the turn-
table is released in this way, and the brake
mechanism is then adjusted, by the setting of
the operating lever with respect to the grad-
uated plate to determine the movement of
contact between the trip and trip arm, the at-
taining by the needle of the position on the
record indicated by the graduation of which
said needle registers, will result in auto-
matic operation of the trip arm which by
virtue of its frictional engagement with the
pawl arm 11, release the said pawl arm from
the notch 7, thus permitting the automatic
application of the brake.

Further description of the brake mecha-
nism is considered unnecessary in view of
the fact that the principle illustrated, by
way of example, herein is substantially de-
scribed in detail in my prior Letters Patent,
hereinbefore referred to and any such de-
scription as has been afforded in this speci-
fication is for the purpose of illustrating the
general operation of the device as shown in
the drawing.

It is now proposed to make the operating
lever 17 adjustable in position, with respect
to the brake mechanism, and particularly
with respect to the trip arm 9, so that the
normal position of the operating lever 17
may be varied to suit the type of machine to
which the device is applied, or to suit the po-
sition which will be most desirable and con-
venient to the operator; that is to say, for ex-
ample, in some cases it may be preferable to
have the operating lever at the right hand
side of the machine, while in others it may
be desirable at the left hand side of the ma-
chine.

This may be accomplished by making the
operating lever 17 an independent member,
preferably mounted upon the common pivot
3, and providing the trip arm 9 with an
orificed or slotted quadrant 9^a through which
extends a set pin or other locking device 19,
so that the relaxing of the locking device 19
will permit the independent movement of
the lever 17 to such a position as may be
most convenient, after which the lever may
be secured. Thus, its movement will effect
the operation of the brake mechanism from

that part of the machine in which it has been positioned.

Although the invention has been described with regard to brake mechanism operating upon the turn-table, it is obvious that it is applicable to mechanisms operating upon other parts of the machine, and Fig. 4 illustrates a brake member adapted to transmit motion through a rotary pivot 2 to such transmission elements 20 that may be desired to apply an arresting force to any part of the motor mechanism.

This invention may be developed within the scope of the following claims without departing from the essential features of the said invention and it is desired that this specification and drawing be read as being merely illustrative and not in a limiting sense, except as necessitated by the prior art.

What I claim as my invention is:

1. In a talking machine brake mechanism, an operating lever connected with the said mechanism, said lever being adapted to be temporarily released from such operative connection whereby the said lever may be independently moved to vary its normal and

operative angular relation to the said mechanism, while the remaining parts of said mechanism are undisturbed, and means normally securing said lever against such independent movement.

2. In a talking machine brake mechanism having a trip arm, a hand lever operating said trip arm, said lever being capable of adjustment angularly with respect to said trip arm without disturbing the relation between the parts of the brake mechanism and said trip arm, and means whereby the said lever may be rendered operatively rigid with the said trip arm.

3. In a talking machine brake mechanism having a trip arm, a lever operating said trip arm, a common pivot upon which both said arm and said lever are mounted, and adjustable locking means securing said lever to said arm.

Signed at the city of Toronto, in the county of York, in the Province of Ontario, in the Dominion of Canada, this 7th day of July, 1917.

CHARLES O. SCOTT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

MACHINE FOR REPOINTING PHONOGRAPH NEEDLES.

1,256,978 ----- D. W. Causey,
Patented Feb. 19, 1918,
Filed Sept. 25, 1917.

D. W. CAUSEY.
MACHINE FOR REPOINTING PHONOGRAPH NEEDLES.
APPLICATION FILED SEPT. 25, 1917.

1,256,978.

Patented Feb. 19, 1918.
2 SHEETS—SHEET 1.

FIG. 1.

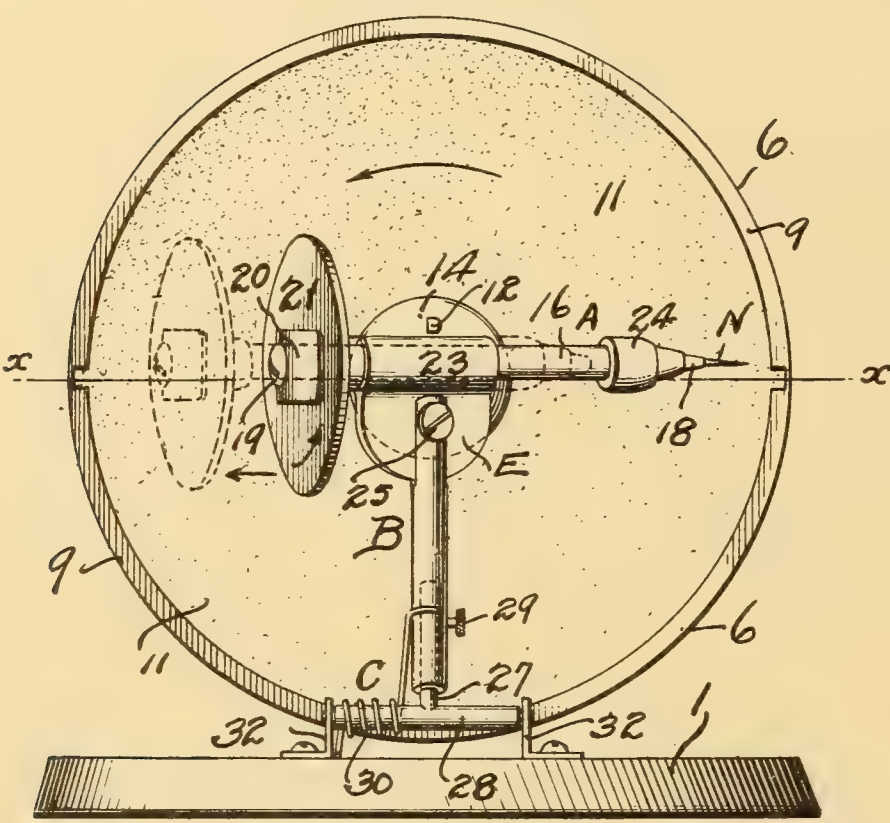


FIG. 3.

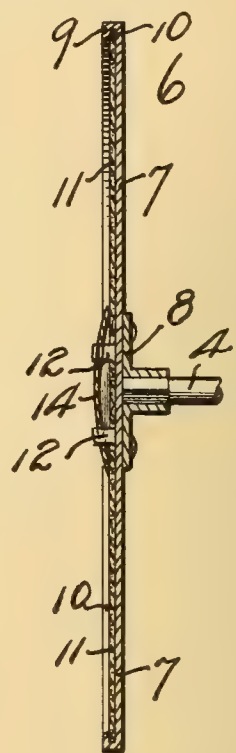


FIG. 2.

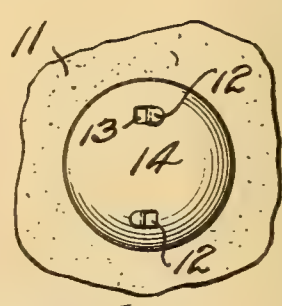
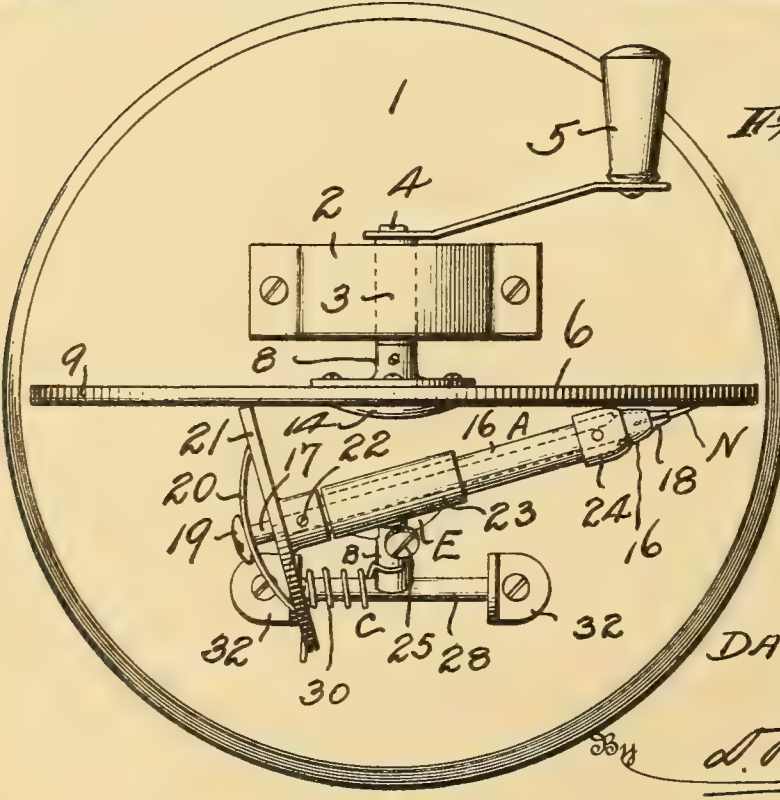


FIG. 4.

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MACHINE FOR REPOINTING PHONOGRAPH NEEDLES.
APPLICATION FILED SEPT. 25, 1917.

1,256,978.

Patented Feb. 19, 1918.

2 SHEETS—SHEET 2.

Fig. 5.

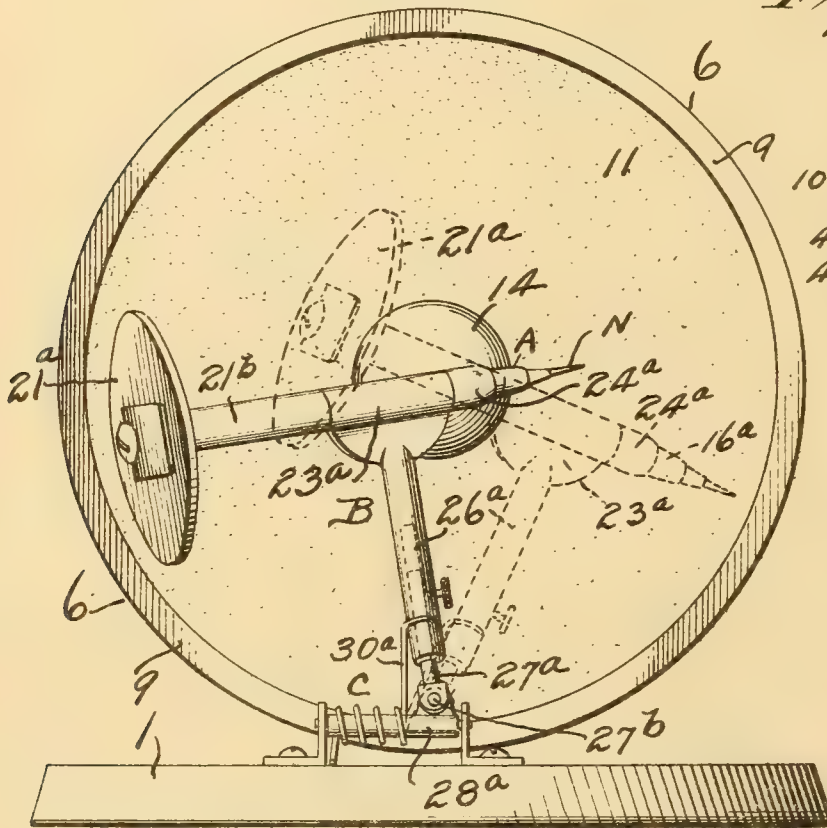


Fig. 8. Fig. 9.

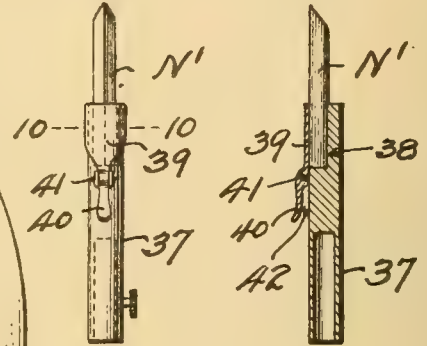


Fig. 10.



Fig. 6.

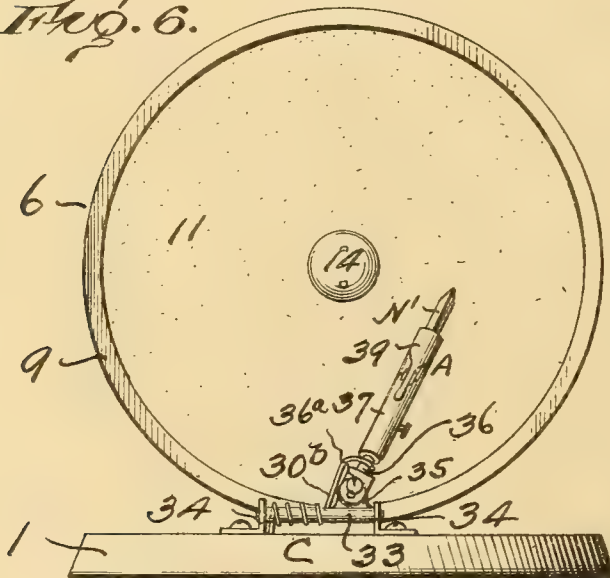
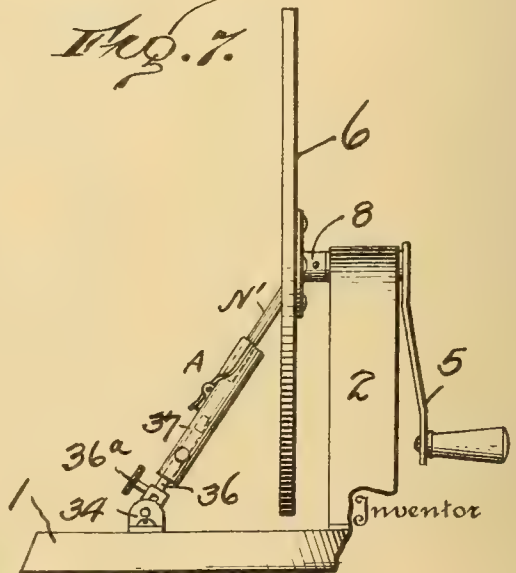


Fig. 7.



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MACHINE FOR REPOINTING PHONOGRAPH-NEEDLES.

1,256,978.

Specification of Letters Patent.

Patented Feb. 19, 1918.

Application filed September 25, 1917. Serial No. 193,171.

To all whom it may concern:

Be it known that I, DANIEL W. CAUSEY, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Machines for Re-pointing Phonograph-Needles, of which the following is a specification.

This invention relates to grinding and sharpening devices, and more particularly to a novel improvement in machines for re-pointing phonograph needles.

As is well known graphophone needles are made of a relatively high grade of steel, and in order to obtain the best results they must have a perfect and sharp point. After a needle is once used it is ordinarily, and as a matter of fact should be, discarded because its point either wears down or becomes distorted whereby its further use injures the sound grooves of the record. This practice however, involves an unnecessary waste since the bulk of metal is in the needle body. And, owing to the impending shortage of suitable steel for making these needles and the consequent high market price, it is desirable to repoint used needles for the purpose of prolonging their life and further use. This may be readily done since, as stated, the body portion of the needle contains ample metal for resharpener, and therefore each needle may be repointed a number of times because only a relatively small amount is removed at each sharpening operation.

Accordingly, the present invention has in view a novel, practical and reliable machine which may be manufactured at a relatively small cost and successfully utilized to re-point used needles. In this connection it is proposed to provide a machine having but few and inexpensive parts which may be readily adjusted, and which performs the sharpening operation automatically by the simple rotation of an abrasive disk.

Another object of the invention is to provide a novel form of needle holding device which will automatically shift the needle across the face of the sharpening disk simultaneously with the rotation thereof, without the use of an expensive screw feed.

A further object of the invention is to provide a construction which will permit of the use of interchangeable needle holding devices, whereby it will not only be possible

to repoint steel needles, but also improve the points of fiber needles which are of triangular cross section.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a front elevation of my device.

Fig. 2 is a top plan view thereof.

Fig. 3 is a cross sectional view of the abrasive disk.

Fig. 4 is a detail view of the button used to clamp the abrasive sheet to the disk.

Fig. 5 is a front elevation similar to Fig. 1, showing a modification of the device.

Fig. 6 is a view similar to Fig. 5 showing a further modification of the invention which includes a type of needle holder adapted to be used for sharpening fiber needles.

Fig. 7 is a side elevation of the construction shown in Fig. 6.

Fig. 8 is a detail top plan view of the fiber needle holder.

Fig. 9 is a longitudinal sectional view of the construction shown in Fig. 8.

Fig. 10 is a cross sectional view on the line 10—10 of Fig. 8.

Similar references designate corresponding parts throughout the several figures of the drawings.

In carrying the present invention into effect, it will be understood that various changes in material and minor structural features may be resorted to in order to meet manufacturing requirements. However, all forms of the invention essentially include an abrading unit, and a novel needle holding device for supporting and maintaining the needle in proper relation thereto.

Referring now to the general features of the invention which are more or less common to all forms thereof it will be observed that it is proposed to provide a suitable base or stand 1, having mounted thereon a standard 2 provided at its upper end with a journal bearing 3 for receiving a horizontal drive shaft 4 fitted at one end with a crank or

handle 5, while the opposite end thereof carries the abrasive element designated generally as 6.

This abrasive element is preferably in the form of a disk or platen which may be made of such a form that the abrasive surface may be renewed when required, thus avoiding the expense of a solid abrasive element and at the same time providing a disk which is economical from a manufacturing standpoint. By reference to Fig. 3 it will be observed that said disk preferably comprises a suitable body 7 having fitted to the reverse side thereof any suitable shaft connector such for instance as the boss 8 for receiving the shaft 4, while its outer periphery is formed with an intumed or folded holding flange 9 which provides a keeper groove 10 for the peripheral edge portion of a renewable abrasive filler 11, such as emery cloth or the like. Since the central portion of this filler 11 is not used, it is preferably cut away so that a pair of reversely disposed keeper hooks 12, which project from the central part of the obverse side of the body 7, may readily engage with suitable perforations 13 in a holding button 14 that is preferably of a springy nature, and when in position and engaged by the hooks locks the central part of the abrasive filler to the body portion of the platen 6. With this construction of the latter it will be apparent that when the abrasive filler 11 wears out it may be readily replaced.

Reference will now be made to the needle holding member of the machine which constitutes a novel and distinctive feature of the present invention. This needle holding member in all forms of the machine essentially coöperates with a suitable tensioning device. That is to say, in the form of the invention for sharpening steel needles, and also the form of the invention for sharpening fiber needles, said needle holder is detachably carried by a suitable tensioning device which serves to give the same the proper set and maintain the point of the needle in contact with the abrasive or sharpening surface.

In connection with the construction shown in Figs. 1 and 2 of the drawings it will be observed that the needle holder essentially includes in its organization a needle carrier designated generally as A and a suitable support or standard B for detachably and adjustably engaging the tension device C. Said needle carrier A may consist of a tubular barrel 16 having mounted therein a rod 17 provided at one end with a suitable needle gripping chuck element 18 while its other end is formed with a head 19 adapted to be engaged by a suitable spring 20 whose free end portions are in contact with one side of a traction wheel 21 rigidly fitted to the tubular sleeve 16 as indicated at 22. This traction wheel 21 preferably has a smooth pe-

riphery and frictionally engages the abrasive surface 11 as will presently appear, and its diameter represents the altitude of a triangle whose base is the face of the disk 6 and whose hypotenuse is the axis of the rod 17, whereby the needle N will be held against the surface of the abrasive element 11 at the proper angle. The construction of the needle chuck 18 is such that when the head 19 of the rod 17 is pushed inwardly against the tension of the spring 20, the jaws thereof will open to receive the needle N, but when the spring 20 is exerting its force on the underside of the head 19, the rod 17 will be placed under tension whereby the jaws of the chuck 18 will tightly grip or clamp the needle. When the needle carrier 4 is in its normal condition, that is to say when the spring 20 is exerting its influence on the rod 17, it will be clear that the chuck element 18 will be frictionally locked with the tubular barrel 16, which as previously indicated carries therewith the traction wheel 21, whereby any rotary movement imparted to the traction wheel by the disk 6 will also be imparted to the chuck and the needle held therein.

As will be observed from the drawings, the tubular barrel 16 is slidably mounted in a suitable sleeve 23, and as shown when the barrel is pushed forward the hub of the wheel 21 constitutes an abutment which will engage with one end of the sleeve to prevent further forward movement, and, in order to provide for the proper travel of the barrel to permit the entire carrier to shift across the face of the disk simultaneously with the rotation thereof, another abutment 24 is secured to the other end of the barrel 16, adjacent the chuck 18. Thus, it will be clear that the needle carrier may have a sliding movement in the sleeve 23 between the limits of the hub of the wheel 21 and the annular abutment ring 24.

The said sleeve 23 has formed integral therewith an ear E which is pivotally connected at 25 with the hollow support for standard B adapted to telescopically receive at its lower end the angularly disposed spur 27 on the shaft 28 of the tension device C. For the purpose of maintaining the proper vertical adjustment between the spur or arm 27 and hollow standard B a set screw 29 may be utilized. And, in order to place the shaft 28 under the necessary spring tension to press the standard B inwardly toward the face of the abrasive disk, a suitable coil spring 30 or its equivalent may be employed. The said shaft 28 which carries the spur 27 may be conveniently journaled as at 31 in brackets 32 carried by the base 1.

With the foregoing arrangement it will be apparent that, owing to the disposition of the wheel 21 the entire needle carrier A is maintained at an acute angle with respect

to the abrasive surface of the platen 6, whereby the proper angle may be given to the needle point, and when the said platen is rotated in the direction of the arrow shown in Fig. 1 the traction wheel 21 will also be driven in the direction of the arrow thereon since it is in frictional contact with the face of the disk. This movement of the wheel 21 by the disk causes the rotation of the entire needle carrier, and at the same time causes the wheel to shift radially from the center of the disk toward the periphery thereof to thus shift the needle carrier as indicated by the dotted lines in Fig. 1. This shifting of the carrier across the face of the disk simultaneously with the rotation thereof is due to the tractive effect of the surface of the disk on the wheel 1, which has the action of a screw in feeding or shifting the wheel from the center toward the periphery with increasing speed as the wheel advances from the center toward the periphery of the disk owing to the larger path traveled by the wheel over the face of the disk as it moves. In order to produce the desired shifting of the needle carrier through the frictional engagement of the wheel 21 with the face of the abrasive element it is necessary that the longitudinal axis of the needle carrier, which is also the axis of the wheel 21, be in a plane at one side of the axis of the platen or disk, as shown by the drawings. If the axes of both the wheel and abrasive disk were located in the same plane for instance that indicated at $x-x$ of Fig. 1, the point of tangential contact of the wheel with the disk would also be in the same plane and the wheel 21 would merely rotate and not shift. However, by making the point of contact of the wheel 21 at either one side or the other of a plane intersecting the axis of the disk 6, the benefit of a force parallel to a tangent to the disk 6 is utilized to produce the desired shifting of the carrier. Accordingly, from the foregoing it will be clear that the needle is rotated, and at the same time the entire needle carrier is drawn across the face of the disk when the same is rotated owing to the manner in which the wheel 21 engages with the abrasive face of the disk 6.

In the form of the invention shown in Figs. 1 and 2 of the drawings, the lateral shifting of the needle carrier takes place parallel to the diameter of the abrasive disk, since the tubular barrel 16 has a free sliding movement in the sleeve 23. However, in Fig. 5 of the drawings a modification of the invention is shown wherein the tubular barrel 16^a may be of the same length but has no sliding movement in the sleeve 23^a owing to the fact that the hub portion 21^b of the actuating wheel 21^a may be extended to abut against one end of the sleeve 23^a while the collar 24^a normally engages the

opposite end of said sleeve, which unlike the sleeve 23 is formed integral with a hollow standard 26^a adjustably fitted on the arm 27^a, pivotally secured to the shaft 28^a as indicated at 27^b, and under tension of the spring 30^a. It will of course be understood that the movement of the carrier A in the sleeve 23^a is not necessarily limited by an extension of the hub 21^b, since a spacing ferrule or its equivalent may be utilized. In this form, instead of the entire needle carrier being shifted across the face of the disk parallel to the diameter thereof it is moved across the face of the same in the path of an arc whose center is the point of pivotal connection 27^b between the arm 27^a and the shaft 28^a. Thus, it will be apparent that the necessary freedom of movement for drawing the needle across the surface of the abrasive simultaneously with the rotation thereof may be effected either through the arrangement shown in Fig. 1 where the entire holder is loosely supported in the sleeve which is pivotally connected to the standard, or by pivoting the holder to the tensioning device as shown in Fig. 5.

Figs. 6 to 10 inclusive illustrate a type of needle holder employed for sharpening fiber needles and the manner in which it is used. As shown, this form of the invention includes the needle holder A and the platen 6 having the abrasive covering 11, and also the tensioning device C. This tensioning device may be of the same form as that shown in Fig. 5, and preferably includes the shaft 33 journaled in suitable brackets 34 and having an outstanding ear 35 for pivotally receiving an arm 36 adapted to telescope within the hollow needle carrier 37. In this form as in the others a suitable spring 30^b is utilized for the purpose of placing the needle holder under tension and maintaining the same against the face of the abrasive.

The said fiber needle holder is, like the other holders, detachably and adjustably fitted to the arm 36 which may be secured at any desired angle by means of a set screw 36^a carried by the lower end thereof and having its inner end impinging on the ear 35, and because of this angular adjustment, combined with the rotary and extensible adjustment of the standard 37 on the arm 36, the proper sharpening angle of the holder may be readily obtained. Referring to the structural details of this holder it will be observed that the same preferably carries at its front end a spring tensioned needle clamping member 39 having a finger piece 40 for rocking the same on the pivot 41 against the tension of a spring 42 or its equivalent which normally maintains the member 39 over the socket 38. As shown in the drawings, the fiber needle is placed in the end of the carrier 7 and held in contact with the surface of the

abrasive 11 as per Figs. 6 and 7 under the tension of the spring 30^b. And, by adjusting the holder 37 on the arm 36, the length of the telescoped parts may be increased or diminished thereby altering the angle between the beveled edge of the needle and the surface of the disk to obtain the desired pitch for sharpening the needle.

From the foregoing it is thought that the structure of the present invention will be readily apparent, and summarizing the novel features thereof it may be noted that the provision of a device which makes possible the use of interchangeable needle holders is of special advantage, since, as the machine is particularly intended for home use, all types of changeable needles used on talking machines may be repointed expeditiously and accurately. In connection with the needle holder, particularly the forms thereof shown in Figs. 1 to 5, it will be seen that not only an adjustable connection is provided between the same and the tension device, but the entire holder has a universal mounting on the tension device since it is free to turn on the arm 27 or 27^a and has an adjustment parallel to the axis of the support or standard B through the provision of the pivots 25 or 27^b. Furthermore, due to this mounting and the disposition of the wheel 21 of the needle carrier, each and every needle sharpened by the machine is held at the same angle and thus uniformly pointed.

I claim:—

1. A needle sharpening machine including a platen having an abrasive surface, a tension device located at one side of the platen and a needle holder adjustably and detachably connected therewith.

2. A needle sharpening machine including a platen having an abrasive surface, a tension device located at one side thereof and including a spring tensioned member, and a needle holder detachably and adjustably connected with the member.

3. A needle sharpening machine including a base, a rotary platen having an abrasive surface supported on the base, a tension device consisting of brackets carried by the base, a spring tensioned member journaled in the brackets, and a needle holder adjustably and detachably connected to the member.

4. A needle sharpening machine including an abrasive disk and a needle holder including a needle carrier disposed at an angle to the disk, and means actuated by the rotation of the disk for simultaneously rotating the needle carrier and shifting the same on the face thereof.

5. A needle sharpening machine including an abrasive disk and a needle support mounted at one side of the disk, said needle support being under spring tension and including a needle carrier having a wheel

adapted to engage with the abrasive surface of said disk.

6. A needle sharpening machine including a disk having an abrasive face, a needle support including a tension device and a needle carrier adjustably connected therewith, and a wheel fitted to said needle carrier and contacting with the disk for shifting the same across the face thereof.

7. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, a needle holder adjustably connected to the said tension device and including a needle carrier having a needle chuck at one end and an actuating wheel at the other end.

8. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, a needle holder adjustably connected to said tensioning device and including a needle carrier and having a needle gripping chuck at one end and an actuating wheel at the other end having a smooth periphery engaging with said abrasive surface of the platen, and said wheel being disposed at an angle to said surface of the platen.

9. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, a needle holder having a universal connection with said tension device and including a needle carrier having a needle chuck at one end and an actuating wheel at the other end.

10. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, a needle holder including a needle carrier and a support for the carrier having a sleeve at one end for loosely receiving the same, and means at the other end for adjustably and detachably connecting with the tension device.

11. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, a needle holder connected with the tension device and including a needle carrier having means for shifting the same across the abrasive surface.

12. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, and a needle holder including a needle carrier having needle clamping means at one end and an actuating wheel at the other, said wheel having its tangential point of contact located at one side of a plane intersecting the axis of the platen.

13. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, and a needle holder adjustably con-

connected to said tensioning device and including a needle carrier having its axis lying in a plane disposed at one side of the axis of the rotary platen.

14. A needle sharpening machine including a rotary platen having an abrasive surface, a tension device located at one side thereof, and a needle holder adjustably and detachably connected to said tensioning device, said needle holder including a sleeve, a needle carrier comprising a barrel slidably mounted in said sleeve, a rod within the barrel having needle clamping means at one end and a head at the other, an actuating wheel secured to said barrel, a spring interposed between the head of said rod and one side of said wheel, and an abutment ring fitted to the barrel near the needle receiving end whereby the barrel may have a sliding movement in said sleeve.

15. A needle sharpening machine including an abrasive element, a needle holding device consisting of a needle carrier and a support therefor, and a spring tensioned member adjustably engaged by the support of said device.

16. A needle sharpening machine including an abrasive element, a needle holding device, a tension device, and a jointed and adjustable connection therebetween.

17. A needle sharpening machine including a rotatable platen having an abrasive

surface, and a needle holding device yieldably supported at one side of the platen said device including a needle carrier having an actuating wheel at one end and a needle chuck at the other, and said wheel and chuck respectively contacting with the abrasive surface of the disk at points located in adjacent quadrants of the disk at the same side of the axis thereof whereby the chuck is rotated in opposition to the path of movement of the disk.

18. A needle sharpening machine including a rotatable platen having an abrasive surface, and a needle holding device arranged at one side thereof, said needle holding device including a tension device, a supporting standard detachably and adjustably engaged with the tension device, a needle carrier mounted in said standard and including a hollow barrel, a rod located therein and having a needle gripping portion at one end, a spring for placing said rod under tension in one direction, and an actuating wheel fitted to the barrel and contacting with the platen.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

DANIEL W. CAUSEY.

Witnesses:

JAMES H. MARR,
EMORY L. GROFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

REPRODUCTION OF SOUND CHARACTERISTICS.

1,257,075 ----- P. W. Fuller,
Patented Feb. 19, 1918,
Filed Sept. 20, 1910,
Renewed June 28, 1917.

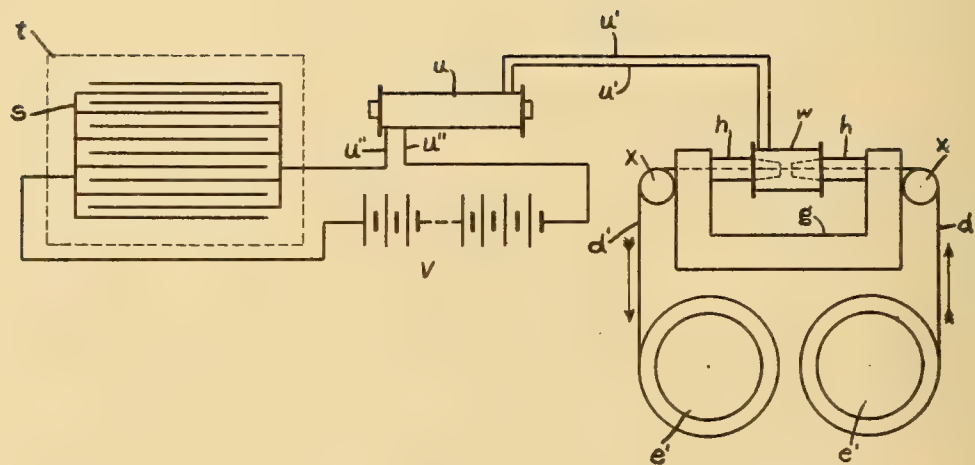
P. W. FULLER.

REPRODUCTION OF SOUND CHARACTERISTICS.

APPLICATION FILED SEPT. 30, 1910. RENEWED JUNE 28, 1917.

1,257,075.

Patented Feb. 19, 1918.



Inventor
Percy W. Fuller
by *Heard Smith & Tennant.*
Attys.

UNITED STATES PATENT OFFICE.

PERCY WHEATON FULLER, OF BOSTON, MASSACHUSETTS.

REPRODUCTION OF SOUND CHARACTERISTICS.

1,257,075.

Specification of Letters Patent.

Patented Feb. 19, 1918.

Application filed September 30, 1910, Serial No. 584,731. Renewed June 28, 1917. Serial No. 177,595.

To all whom it may concern:

Be it known that I, PERCY WHEATON FULLER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements Relative to Reproduction of Sound Characteristics, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

My improved reproducer is formed somewhat after the manner of a condenser, that is, by superposing a plurality of sheets of tin foil, oiled silk or similar dielectric material on each other and then connecting the sheets in a manner hereinafter specified with a circuit arranged to have an undulating current therein, the undulations of which vary according to the sound characteristics to be reproduced.

In order to give a complete understanding of the invention, I will first describe a selected embodiment thereof and then point out the novel features in the appended claim.

The drawings show diametrically a device embodying my invention. The reproducer is in the form of a condenser made by superposing sheets of very thin pure tin foil and sheets of a suitable dielectric material, such as oiled silk or relatively puncture-proof paper or its equivalent, said sheets being arranged alternately and laid loosely on each other. The alternate sheets of tin foil are electrically connected together and connected to one side of a circuit and the other sheets of tin foil are electrically connected together and connected to the other side of the circuit, said sheets all lying loosely one on the other and without mechanical pressure. Means are provided to produce an undulating current in the circuit connected to the reproducer, which undulating current has variations corresponding to the sound characteristics to be reproduced. The condenser or reproducer thus constructed is shown generally at *s*, wherein it is indicated more or less diagrammatically. In practice I propose to use about one hundred sheets of very thin pure tin foil which are smooth and flat and about one hundred sheets of thin smooth puncture-proof paper. This paper may be prepared by immersing each sheet in and evenly impregnating it with pure melted paraffin wax, wax being preferably selected for this purpose which has a high

melting point. The wax-coated sheets constitute flexible dielectric leaves. While these sheets may have any suitable size, I prefer to have each sheet approximately five and a half by eight and a quarter inches. The sheets are superposed one on another and arranged so that the sheets of tin foil and dielectric material alternate with each other. Said sheets are loosely placed on each other, and are, therefore, free to vibrate, and for the purpose of my invention it is of importance that the qualities of light weight and flexibility be combined in the highest attainable degree and also that the sheets should all lie as smoothly together as possible without mechanical pressure. The alternate tin foil sheets are electrically connected together and are connected to one side of a circuit including a suitable source *u* of constant electro-motive force of about two hundred and fifty to three hundred volts. The remaining tin foil sheets are also electrically connected together and connected to the other side of said circuit. This circuit connects at *u''* with the terminals of the secondary winding of an induction coil *u*. The primary winding *u'* of this induction coil is connected to an apparatus designed to produce a variable current in said circuit, which current varies in accordance with the variations of the sound characteristics desired to be reproduced. The varying current in the primary of the induction coil produces inductively a correspondingly variable current in the secondary of said coil and this produces corresponding variations in the charge of the condenser *s*. The source of electro-motive force *v* imparts to the condenser an initial charge which places it under initial stress. The effect of the variable current produced in the circuit connecting with the condenser is to throw the flexible dielectric leaves of said condenser or reproducer into vibration, and such vibration will cause a reproduction of sounds having characteristics corresponding to the variations in the primary circuit of the induction coil.

The desired variable current in the primary circuit of the induction coil may be produced in various ways. As herein shown, it is produced by means of a non-magnetic record-bearing ribbon *d* having thereon a deposit of magnetically-permeable metal which varies at different points along the ribbon in accordance with the variations in the quality, pitch and volume of the sounds record-

ed. This ribbon is shown as extending through an aperture in two pole pieces h, h of a magnet yoke g , said ribbon passing over direction pulleys x , and the ends thereof being wound on the two spools e' . w indicates a coil of conducting wire which is mounted on the pole pieces h, h in such a manner as to inclose the gap between the pole pieces. The terminals of the coil w are connected to the primary u' of the induction coil u . As the record ribbon d is wound from one spool e' onto the other spool and passes through the coil w , a variable current is induced in said coil, the variations of which correspond to the variations in the deposit of the magnetically-permeable metal on the ribbon d by reason of the fact that the varying amounts of the deposit at different points cause a variation in the amount of reluctance to the magnetic lines passing between the poles h, h , and such varying reluctance causes a variation in the magnetic flux which in turn produces the varying current in the coil w . A variable current is thus produced in the primary of the induction coil u which varies in accordance with the sounds recorded on the ribbon d , and such varying current causes vibrations which reproduce the sound, as above described. I wish to state, however, that this particular way of producing the

desired variations in the primary winding of the induction coil u is not essential to the invention.

While I have herein described one embodiment of my invention, I do not wish to be limited to the constructional details shown.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

In a device of the class described, the combination with a reproducer comprising a plurality of sheets of tin foil and flexible dielectric material arranged alternately and superposed one on the other loosely in a horizontal position and without mechanical pressure, of a direct current circuit of two hundred and fifty to three hundred volts, one side of which is connected to the alternate sheets of tin foil and the other side of which is connected to the other sheets of tin foil, and means to impress on the direct current circuit an undulating current having variations corresponding to the variations of sound characteristics to be reproduced.

PERCY WHEATON FULLER.

Witnesses:

ALEXANDER C. MacKAY,
JOHN C. SHERMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

WINDING DEVICE FOR SPRING MOTORS.

1,257,286 ----- J. W. Jones,
Filed June 13, 1917,
Patented Feb. 19, 1918.

J. W. JONES.
WINDING DEVICE FOR SPRING MOTORS.
APPLICATION FILED JUNE 13, 1917.

1,257,286.

Patented Feb. 19, 1918.

Fig. 1.

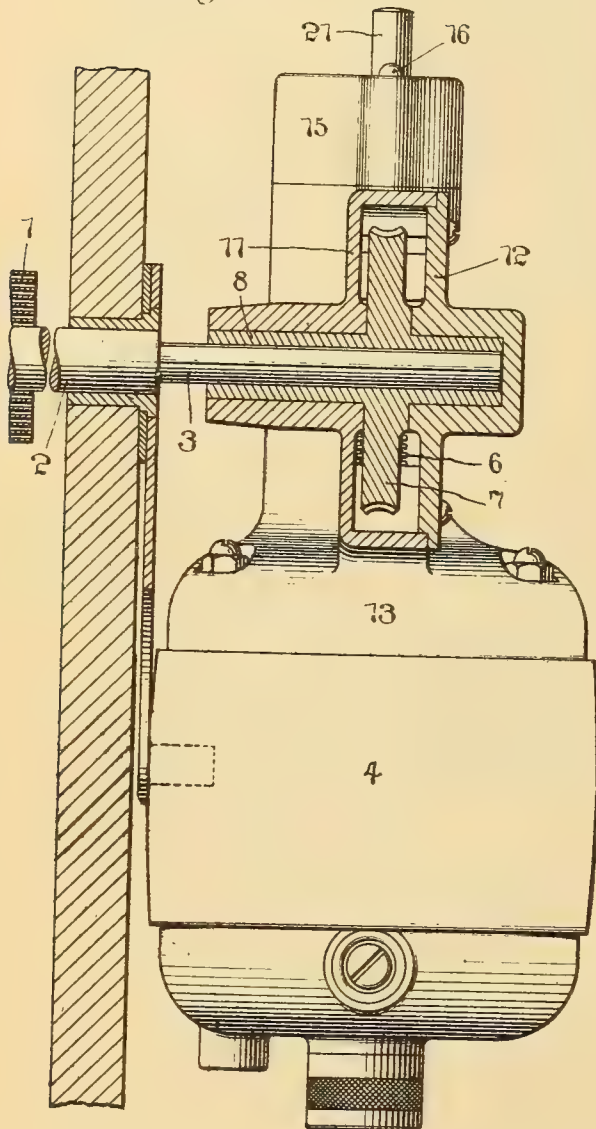


Fig. 2.

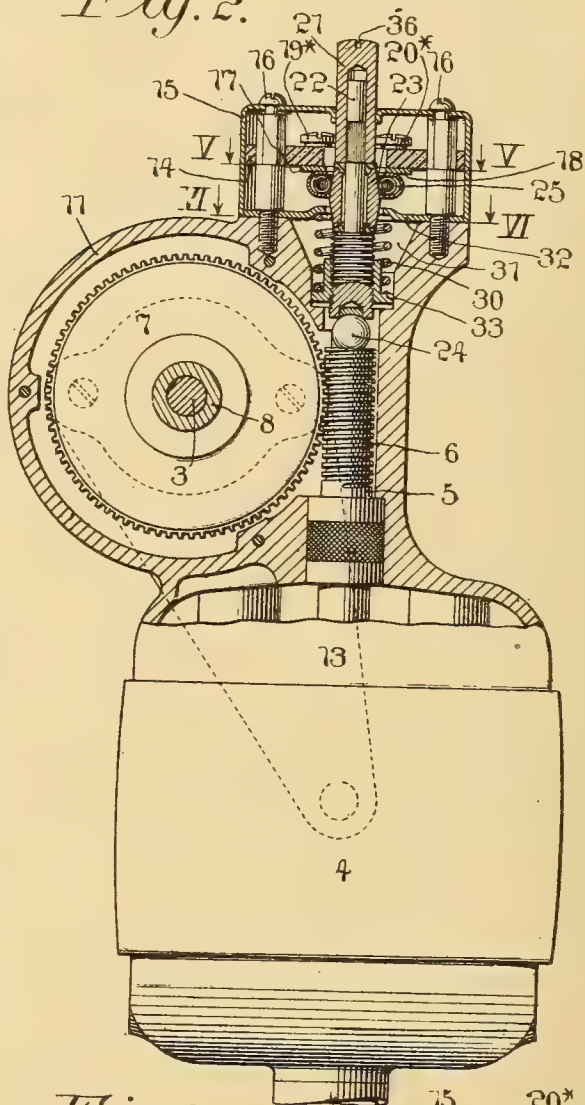


Fig. 3.

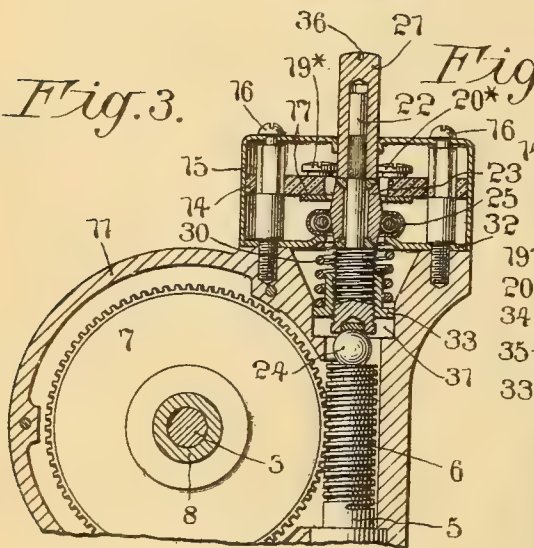


Fig. 4.

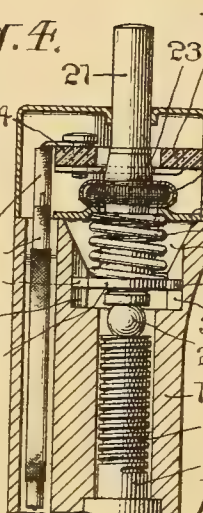


Fig. 5.

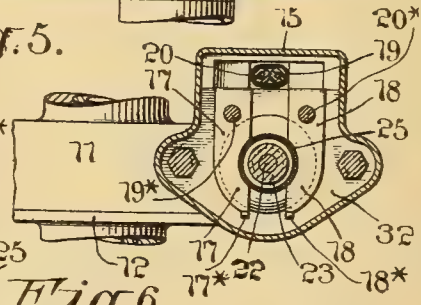
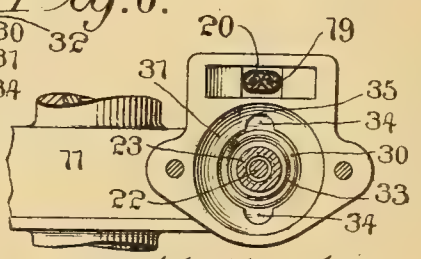


Fig. 6.



Inventor. Joseph W. Jones
by attorneys
Brown & Lund

UNITED STATES PATENT OFFICE.

JOSEPH W. JONES, OF NEW YORK, N. Y., ASSIGNOR TO JONES MOTROLA, INC., OF
NEW YORK, N. Y., A CORPORATION OF NEW YORK.

WINDING DEVICE FOR SPRING-MOTORS.

1,257,286.

Specification of Letters Patent.

Patented Feb. 19, 1918.

Application filed June 13, 1917. Serial No. 174,512.

To all whom it may concern:

Be it known that I, JOSEPH W. JONES, a citizen of the United States, and resident of the borough of Manhattan, in the city
5 and State of New York, have invented a new and useful Improvement in Winding Devices for Spring-Motors, of which the following is a specification.

This invention is directed to means for
10 maintaining a spring motor under operative tension at all times and includes a winding motor and means for connecting it to the spring motor whereby the operation of the winding motor is controlled by variations
15 in tension of the spring motor spring due to the winding and unwinding thereof.

My invention more particularly includes means for adjusting the points at which the
20 varying tension of the spring motor spring will cause the starting and stopping of the winding motor.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

25 Figure 1 is a view of the winding device, shown partly in elevation and partly in section,

Fig. 2 is a similar view taken at right angles to Fig. 1, the motor controlling
30 switch being shown in its closed position,

Fig. 3 is a detail section similar to Fig. 2, with the motor controlling switch shown in its open position,

35 Fig. 4 is a detail section taken at right angles to Fig. 3,

Fig. 5 is a transverse section taken in the plane of the line V—V of Fig. 2, and

Fig. 6 is a transverse section taken in the plane of the line VI—VI of Fig. 2.

40 The winding device, to which my invention is shown as applied, is of the type shown, described and claimed in my U. S. Letters Patent No. 1,219,325, dated March 13, 1917, a general description of which de-
45 vice, sufficient to understand the operation of my present invention, will follow.

The spring motor spring is denoted by 1; its winding shaft by 2 and the extension shaft by 3. The winding motor 4, in the
50 present instance an electric motor, has a longitudinally movable rotary armature shaft 5. This shaft has a winding connection with the spring motor spring through a worm 6 on the armature shaft and its

worm gear 7 on a sleeve 8 surrounding the
55 extension shaft 3 of the spring motor. The housing for the gears comprises the parts 11, 12 and 13.

The controlling switch for the electric motor comprises the plate 14 of insulating
60 material and the shell 15 secured in position on the gear housing by the screws 16. Two circuit contact pieces 17, 18, are electrically connected to the circuit wires 19, 20, of the electric motor, by the screws 19*,
65 20*, which also serve to secure the contact pieces to the under side of the plate 14; the ends of said contact pieces being turned upwardly, as shown at 17*, 18*, into the body of the plate to prevent the pieces from turn-
70 ing. The longitudinally movable plunger of the switch comprises the members 21, 22 and 23, arranged in alinement with the armature shaft 5 for anti-friction purposes.

A ball 24 is interposed between the adja-
75 cent ends of the armature shaft and switch plunger. The member 23 of the plunger is provided with oppositely tapered portions surrounded by a yielding contact ring 25
80 arranged to be snapped into and out of engagement with the contact pieces 17 and 18 to close and open the circuit for starting and stopping the winding motor as the plunger nears the limits of its inward and outward movements, respectively.

85 The upper member 21 of the plunger is frictionally locked to the lower member 22 and projects upwardly out of the shell 15 to serve as a manual means for moving the plunger inwardly to close the circuit for
90 starting the winding motor, at pleasure. The tendency of the spring motor spring to unwind exerts an endwise pressure on the armature shaft 5 through the worm gear 7 and worm 6 tending to move the armature
95 shaft longitudinally in a direction to open the switch through the medium of the members 21, 22, 23, which pressure varies as the resistance of the spring motor spring varies.

The automatic means provided for start-
100 ing the winding motor when the spring motor spring reaches a predetermined low resistance, comprises a coil spring 30 seated in the recess 31 of the gear housing between a plate 32 at the top of the recess and the
105 flange of a traveling nut 33 having a screw threaded engagement with the member 22 of the switch plunger. This nut is held

against rotary movement by providing it with ears 34 sliding in slots 35 in the walls of the recess 31.

5 The tension of the spring 30 may be accurately adjusted to any desired degree by turning the switch plunger in either direction. This may be conveniently done by providing the top of the member 21 of the
10 plunger with a kerf 36 for the reception of a screw driver or other suitable tool. The tension of this spring 30 is made so that it will overcome the pressure exerted by the resistance of the spring motor spring when the said spring motor spring tension is re-
15 duced to a predetermined degree by the unwinding thereof, and will, in turn, be overcome by the pressure exerted by the increased resistance of the spring motor spring when the spring motor spring has been
20 wound to a predetermined degree.

The operation of the device is as follows: Assuming the spring motor spring has been unwound to a predetermined low tension and that the switch has been closed by the
25 pressure exerted by the spring 30 and the armature shaft 5 moved endwise to the limit of its movement in one direction, the rotary movement of the armature shaft due to the operation of the electric winding motor,
30 will wind the spring motor spring through the gear up to a point where the endwise pressure on the armature shaft due to the increased tension of the spring motor spring, will move the armature shaft endwise
35 against the pressure exerted by the spring 30 into position to open the switch. This will automatically cause the electric winding motor to stop and thereby cease winding the spring motor spring. When the
40 spring motor spring has been unwound to a predetermined point where its endwise pressure on the armature shaft is less than the pressure of the spring 30, the spring 30 will move the plunger and thereby the armature
45 shaft endwise in the opposite direction and thereby close the switch to again start the winding motor.

It will be seen that these predetermined points of starting and stopping the wind-
50 ing motor may be accurately adjusted to suit spring motor springs of various characters and to suit different requirements. This adjustment can be very easily obtained by turning the exposed end of the switch
55 plunger in one direction or the other.

It will also be seen that this adjustment is carried by the manual means for starting the winding motor at any time irrespective of the tension of the spring motor spring,
60 said manual means not interfering in any respect with the automatic operation of the device.

It is evident that the particular means which I have shown for adjusting the ten-
65 sion of the spring 30 is only one of many

different forms; hence I do not wish to limit myself strictly to this particular means, but wish to cover all equivalent means for producing this result.

What I claim is:

70

1. A winding device for spring motors including a winding motor, means for connecting it to the spring motor comprising a movable element whose movement is controlled by the varying resistance of the spring motor spring for starting and stopping the
75 winding motor and adjustable automatically operating means to return the movable element to its original position.

2. A winding device for spring motors including a winding motor, means for connecting it to the spring motor comprising a movable element whose movement is controlled by the varying resistance of the spring motor spring for starting and stopping the
80 winding motor and both manual and adjustable automatically operating means to return the movable element to its original position.

3. A winding device for spring motors including a switch, an electric winding motor, means for connecting it to the spring motor comprising a movable element whose movement is controlled by the varying resistance of the spring motor spring to close
85 and open the switch for starting and stopping the electric winding motor and adjustable automatically operating means to return the movable element to its original position.

100

4. A winding device for spring motors including a switch, an electric winding motor, means for connecting it to the spring motor comprising a movable element whose movement is controlled by the varying resistance of the spring motor spring to close
105 and open the switch for starting and stopping the electric winding motor and both manual and adjustable automatically operating means to return the movable element to its original position.

5. A winding device for spring motors including a winding motor, means for connecting it to the spring motor comprising a movable element which is moved by the resistance of the spring motor spring to stop the winding motor and adjustable automatically operating means to move said element to start the winding motor.

115

6. A winding device for spring motors including a winding motor, means for connecting it to the spring motor comprising a movable element which is moved by the resistance of the spring motor spring to stop the winding motor and both manual and
120 adjustable automatically operating means to move said element to start the winding motor.

7. A winding device for spring motors including a switch, an electric winding mo-
130

tor, means for connecting it to the spring motor, said switch being opened by the resistance of the spring motor spring to stop the electric winding motor and adjustable

5 automatically operating means to close said switch to start the electric winding motor.

8. A winding device for spring motors including a switch, an electric winding motor, means for connecting it to the spring
10 motor, said switch being opened by the resistance of the spring motor spring to stop the electric winding motor and both manual and adjustable automatically operating means to close said switch to start the elec-
15 tric winding motor.

9. A winding device for spring motors including a switch, an electric motor, means for connecting it to the spring motor, said switch being opened by the increased resist-
20 ance of the spring motor spring to a predetermined degree to stop the electric motor and adjustable automatically operating means to close said switch to start the electric motor when the tension of the spring
25 motor spring has been reduced to a predetermined degree.

10. A winding device for spring motors including a switch, an electric winding motor, means for connecting it to the spring
30 motor, the spring motor spring serving as a pressure means to open the switch to stop the electric winding motor and adjustable automatic means to close the switch to start the electric winding motor, the movement of
35 the switch being accomplished by an overbalancing in pressure due to the varying tension of the spring motor spring.

11. A winding device for spring motors including a winding motor, means connect-
40 ing it to the spring motor including a rotary shaft movable endwise in one direction by the increased resistance of the spring motor spring to stop the winding motor and adjustable automatic means for moving the
45 shaft in the opposite direction to start the winding motor when the spring motor spring resistance is reduced to a predetermined degree.

12. A winding device for spring motors including a winding motor, means connect-
50 ing it to the spring motor including a rotary shaft movable endwise in one direction by the increased resistance of the spring motor spring to stop the winding motor, adjustable
55 automatic means for moving the shaft in the opposite direction to start the winding motor when the spring motor spring resistance is reduced to a predetermined degree, and manual means to start the winding motor at
60 pleasure.

13. A winding device for spring motors including a switch, an electric winding motor, means connecting it to the spring motor including a rotary shaft movable endwise in
65 one direction by the increased resistance of

the spring motor spring to open the switch to stop the winding motor and adjustable automatic means to close the switch and move the shaft in the opposite direction to start the winding motor when the spring
70 motor spring resistance is reduced to a predetermined degree.

14. A winding device for spring motors including a switch, an electric winding motor, means connecting it to the spring motor
75 including a rotary shaft movable endwise in one direction by the increased resistance of the spring motor spring to open the switch to stop the winding motor, adjustable automatic means to close the switch and move
80 the shaft in the opposite direction to start the winding motor when the spring motor spring resistance is reduced to a predetermined degree, and manual means to start the winding motor at pleasure.
85

15. A winding device for spring motors including a winding motor, means connect-
ing it to the spring motor including a rotary shaft movable endwise in one direction by the increased resistance of the spring mo-
90 tor spring to stop the winding motor, automatic means for moving the shaft in the opposite direction to start the winding motor when the spring motor spring resistance is reduced to a predetermined degree, manual
95 means to start the winding motor at pleasure, and means carried by the manual means for adjusting the automatic means.

16. A winding device for spring motors including a switch, an electric motor, means
100 for connecting it to the spring motor comprising the longitudinally movable rotary armature shaft whose movement in one direction is accomplished by an increase in pressure thereon due to an increased tension
105 of the spring motor spring to open the switch for stopping the electric motor and adjustable automatic means for moving the armature shaft in the opposite direction when the tension of the spring motor spring is re-
110 duced to close the switch for starting the electric motor.

17. A winding device for spring motors including a switch, an electric motor, means
115 for connecting it to the spring motor comprising the longitudinally movable rotary armature shaft whose movement in one direction is accomplished by an increase in pressure thereon due to an increased tension of the spring motor spring to open the
120 switch for stopping the electric motor and adjustable automatic means for moving the armature shaft in the opposite direction when the tension of the spring motor spring is reduced to close the switch for starting
125 the electric motor, and manual means for closing the switch to start the electric motor.

18. A winding device for spring motors including a switch, an electric motor, means
for connecting it to the spring motor com-
130

prising the longitudinally movable rotary armature shaft, said spring motor spring serving as a means to move the shaft in one direction for opening the switch to stop the electric motor and adjustable automatic means to move the shaft in the other direction and close the switch to start the electric motor, the movement of the shaft being accomplished by an overbalancing in pressure due to the varying tension of the spring motor spring.

19. A winding device for spring motors including a switch, an electric motor, means for connecting it to the spring motor comprising the longitudinally movable rotary

armature shaft, said spring motor spring serving as a means to move the shaft in one direction for opening the switch to stop the electric motor and adjustable automatic means to move the shaft in the other direction and close the switch to start the electric motor, the movement of the shaft being accomplished by an overbalancing in pressure due to the varying tension of the spring motor spring, and manual means for closing the switch to start the motor.

In testimony, that I claim the foregoing as my invention, I have signed my name this 15th day of May, 1917.

JOSEPH W. JONES.

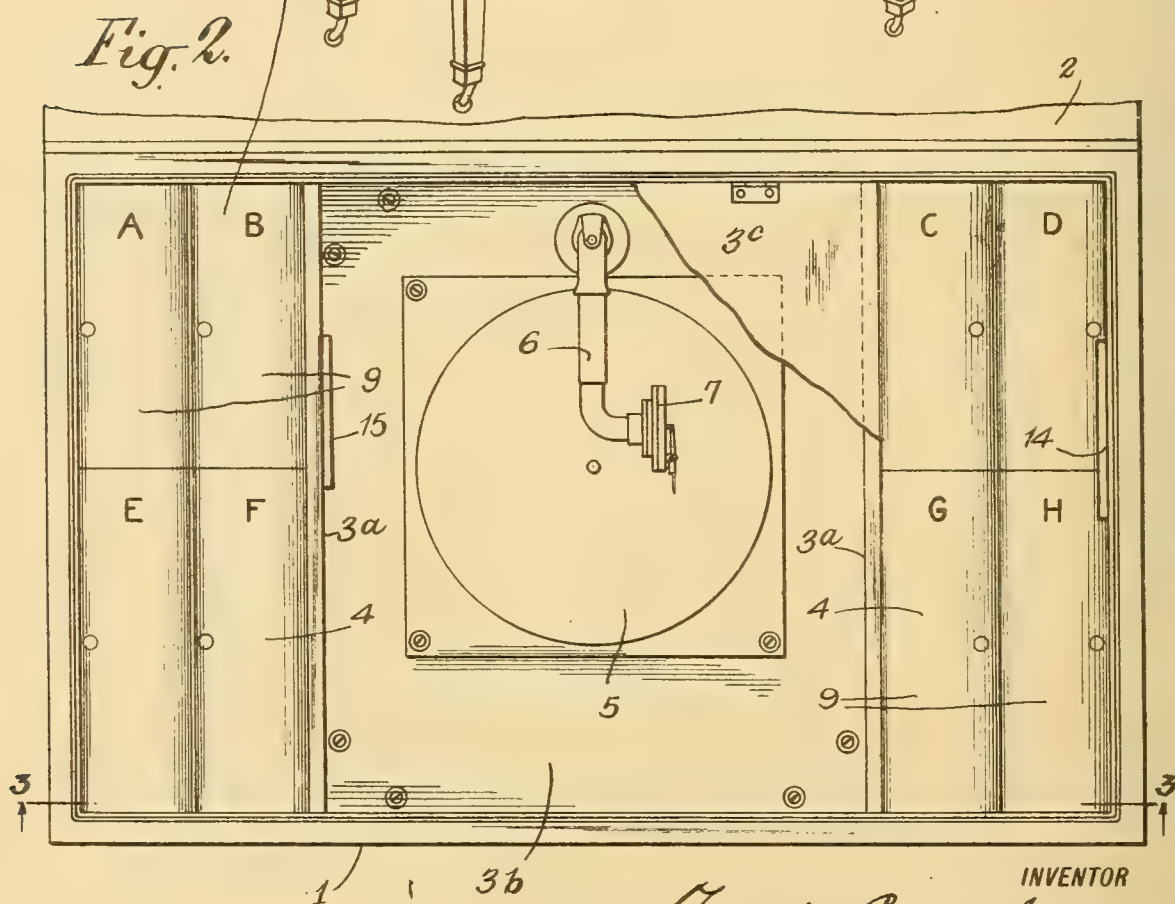
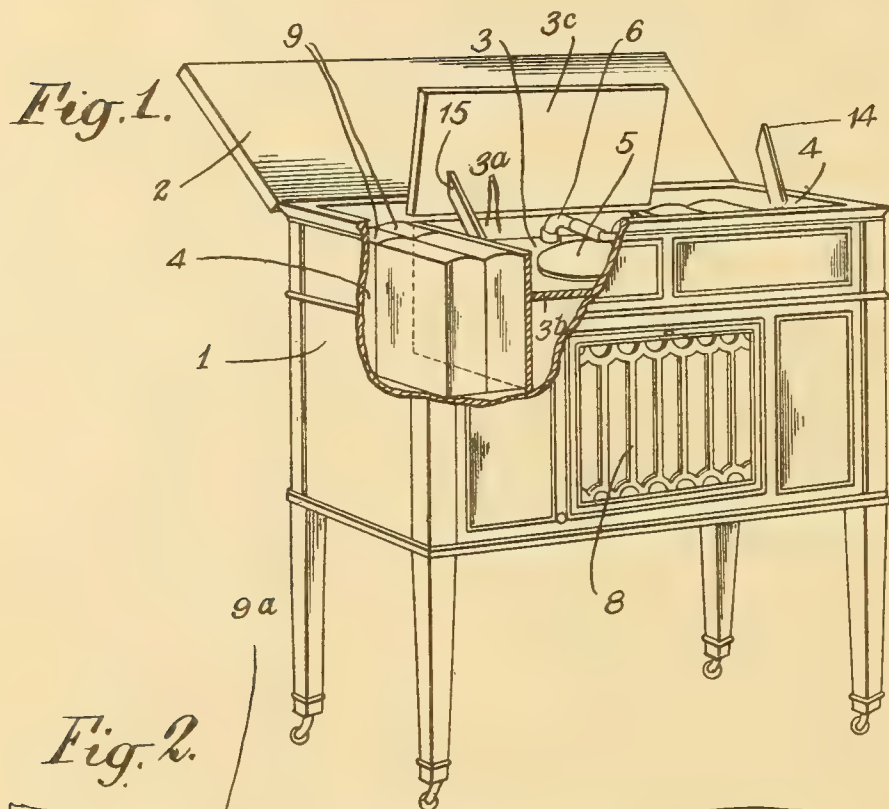
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."

PHONOGRAPH CABINET.

1,257,439 ----- F. L. Young,
Filed Jan. 6, 1916,
Patented Feb. 26, 1918.

1,257,439.

Patented Feb. 26, 1918.
 2 SHEETS—SHEET 1.



INVENTOR
Francis Lincoln Young
 BY
E. W. Scherr Jr. ATTORNEY

1,257,439.

Patented Feb. 26, 1918.

2 SHEETS—SHEET 2.

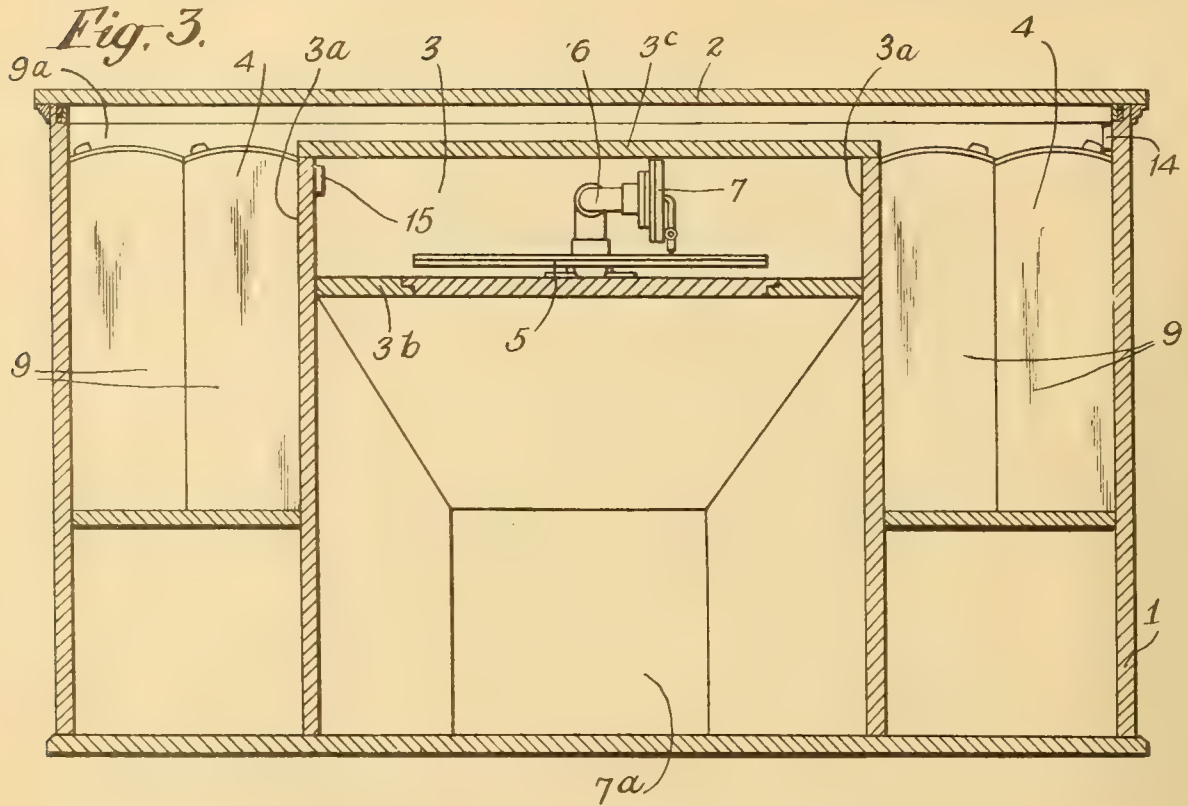


Fig. 4.

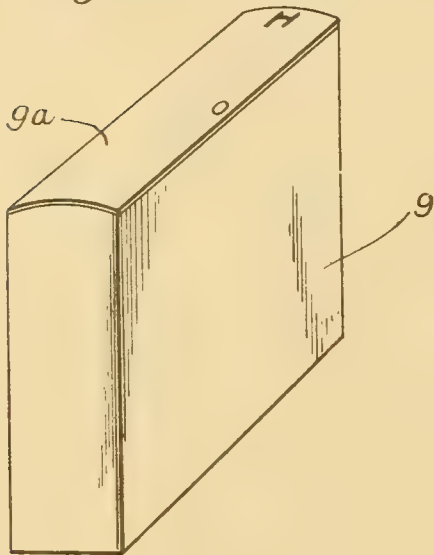
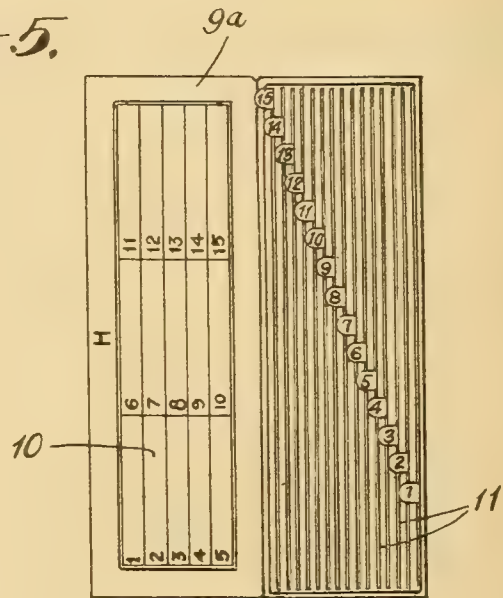


Fig. 5.



Francis Lincoln Young INVENTOR
 BY O. W. Scherr Jr. ATTORNEY

UNITED STATES PATENT OFFICE.

FRANCIS LINCOLN YOUNG, OF NEW YORK, N. Y., ASSIGNOR TO THE AEOLIAN COMPANY,
A CORPORATION OF CONNECTICUT.

PHONOGRAPH-CABINET.

1,257,439.

Specification of Letters Patent.

Patented Feb. 26, 1918.

Application filed January 6, 1916. Serial No. 70,649.

To all whom it may concern:

Be it known that I, FRANCIS LINCOLN YOUNG, a citizen of the United States, and resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Phonograph-Cabinets, of which the following is a specification.

The present invention relates to improvements in phonograph cabinets; and its object, briefly stated, is to facilitate the handling and playing of disk records in a cabinet machine. This is effected, according to the invention, by providing in the top of the machine both a record-playing compartment and one or more separate record-storing compartments, the former compartment containing the turn-table, the tone arm and the sound box. The playing compartment is also equipped with a cover which is individual thereto and entirely distinct and separate from the main cover; and whereas the latter cover is sufficiently large to open and close at one and the same time all of the various compartments, the auxiliary or playing compartment cover is of such a size as to open and close that compartment alone. The auxiliary cover or lid is movable independently of the main cover into open or closed position, and, therefore, may be closed during playing, so as to muffle or avoid all scratching or other objectionable noises or sounds of like character, while the main cover remains open; and may thereafter be opened to permit the record just played to be transferred to its proper storage compartment and replaced by a new record.

In these, Figure 1 is a perspective view of a phonograph cabinet within my invention showing one corner broken away to reveal the interior parts; Fig. 2 is an enlarged plan of the top of the cabinet; Fig. 3 is a vertical section on the line 3—3 in Fig. 2 looking in the direction of the arrows; Fig. 4 is a perspective view of one of the record boxes; and Fig. 5 is a top view of said box with its lid open.

Describing now the specific devices shown in the drawings:—1 is a phonograph cabinet having a lid 2 which closes the top of the cabinet. 3 is a record-playing compartment in the top part of the cabinet bounded by the walls 3^a, and by the front and back of the cabinet, and having a bottom 3^b. Fur-

ther this record-playing compartment preferably has a lid 3^c which can be closed independently of the main lid 2. The result is that this smaller lid alone need be closed during the playing of the instrument whereas the large main lid can be kept open for convenience.

The record-playing compartment of course contains the usual record-supporting turn-table 5, swinging tone-arm 6, and sound-box 7. The tone arm leads through the bottom 3^b of the compartment to the usual horn 7^a (Fig. 3) situated below it,—the mouth of said horn leading to an opening in the front wall of the cabinet covered by the grille door 8 (Fig. 1).

4—4 are record-storing compartments also located in the top part of the phonograph cabinet 1 adjacent the record-playing compartment. These compartments 4 are deep vertically so as to store disk-records in vertical or edge position. For this purpose, the records may be stored in boxes 9 which in turn are set down into the compartments 4. In the particular cabinet illustrated in Fig. 2, there are eight of these boxes, the four marked E, F, G, H being adapted to receive larger diameter records than the boxes A, B, C, D. These boxes 9 are open at the top for the vertical edgewise insertion and withdrawal of records and each has a lid 9^a. The lids bear the designations A to H, to distinguish one box of records from another. Further each lid bears an index 10 to the records in that box, this being preferably on the inside of the lid. (Fig. 5.) The index refers to correspondingly numbered spacing leaves 11 in each box. The title of the record will be written in one of the spaces, say space #1 of the index of box H. The record itself will then be marked H 1, so that after use it will always be returned to and can be found in box H space 1. One box can be used for vocal records, another for violin, etc.

The main lid 2 has a lid-prop 14 for supporting it in open position, and both the record-storing and the record-playing compartments are then conveniently accessible at the top of the cabinet. A record having been withdrawn from one of the boxes 9 may then be played by lifting the lid 3^c of the record-playing compartment 3 until supported by its prop 15, applying the record to the turn-table, starting it in rotation, ad-

justing the sound-box to the record, and lowering said lid 3°. Thus the closing of the lid 3° makes it unnecessary to close the large main lid 2. Further this leaves the record-storing compartments open for unobstructed access to the records.

These and other advantages naturally inhere in my improved phonograph cabinet.

What I claim is:—

10 1. A phonograph cabinet, having both a record-playing and a record-storing compartment; in combination with a movable main lid or cover adapted to open both compartments simultaneously, to afford access
15 thereto; and a separate auxiliary lid for the record-playing compartment alone, movable to open or closed position independently of the main lid, whereby said auxiliary lid may be moved into closed position during the
20 playing of a record while the main lid remains open, and may thereafter be opened to permit the substitution of a new record from the record-storing compartment for the one just played.

25 2. A phonograph cabinet, having separate record-playing and record-storing compartments provided in its top; in combination with a movable main lid or cover adapted to open or close the entire top of the cabinet, in
30 order to afford access to all of said compartments simultaneously when said lid is open; and a separate auxiliary lid disposed beneath the main lid and adapted to open or

close solely the record-playing compartment; said auxiliary lid being movable to 35 open or closed position independently of the main lid, whereby the record-playing compartment may be kept closed during the playing of a record while the main lid remains open, and may thereafter be opened to 40 permit the substitution of a new record from the record-storing compartment for the one just played.

3. A phonograph cabinet, having separate record-playing and record-storing compartments provided in its top; in combination 45 with a hinged main lid or cover adapted to be raised or lowered to open or close the entire top of the cabinet, in order to afford access to all of said compartments when said 50 lid is raised; a separate auxiliary lid connected to the record-playing compartment for movement independently of the main lid to open or close solely the said record-playing compartment; and means for releasably 55 supporting the main lid in raised or open position, whereby the record-playing compartment may be kept closed during the playing of a record while the main lid remains open, and may thereafter be opened to permit the 60 substitution of a new record from the record-storing compartment for the one just played.

Signed at New York city, in the county of New York and State of New York, this 5th day of January, A. D. 1916.

FRANCIS LINCOLN YOUNG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE TONE-ARM.

1,257,939 ----- A. R. Schwarzkopf,
Filed Sept. 9, 1916.
Patented Feb. 26, 1918.

A. R. SCHWARZKOPF.
TALKING MACHINE TONE ARM.
APPLICATION FILED SEPT. 9, 1916.

1,257,939.

Patented Feb. 26, 1918.
2 SHEETS—SHEET 1.

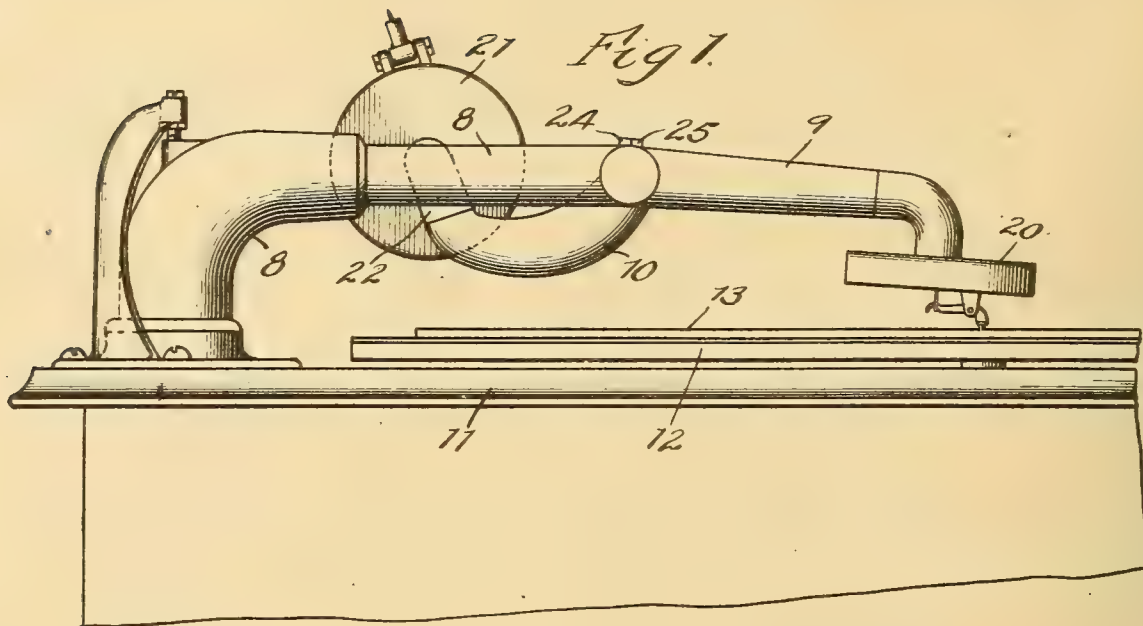


Fig. 2.

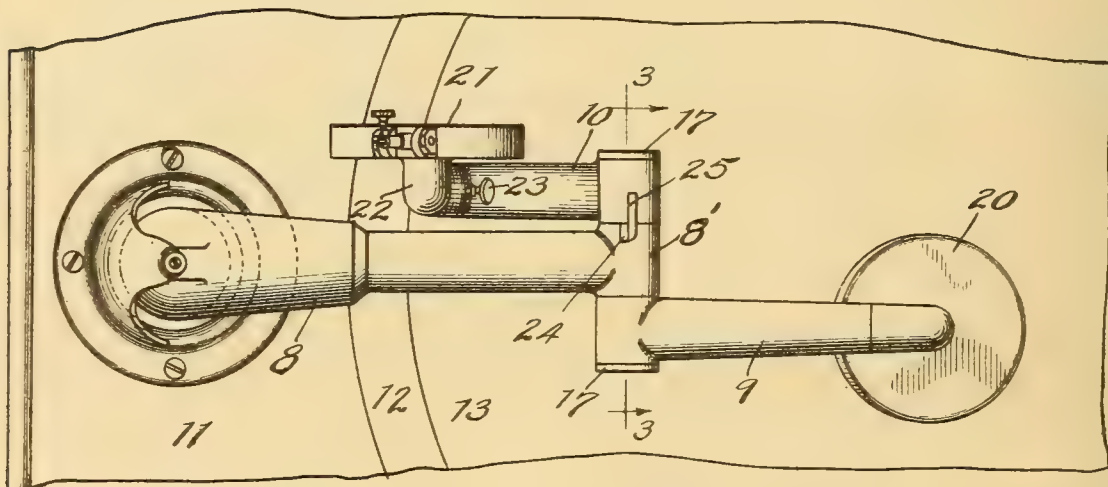


Fig. 3.

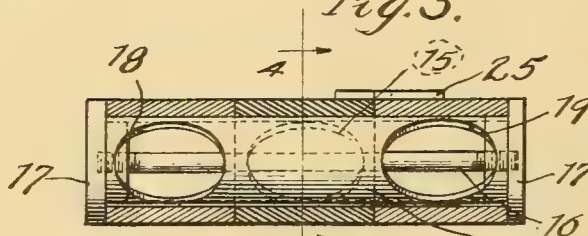
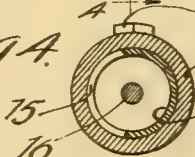


Fig. 4.



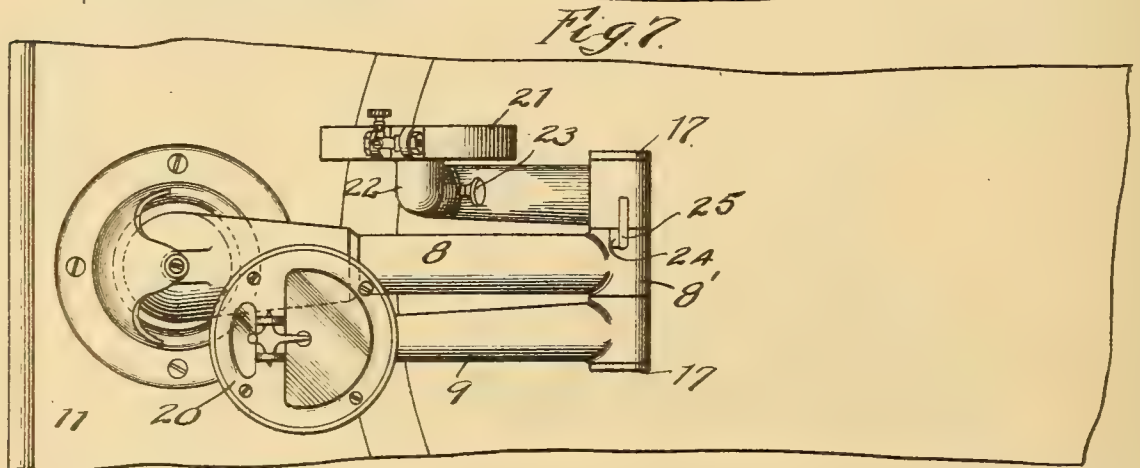
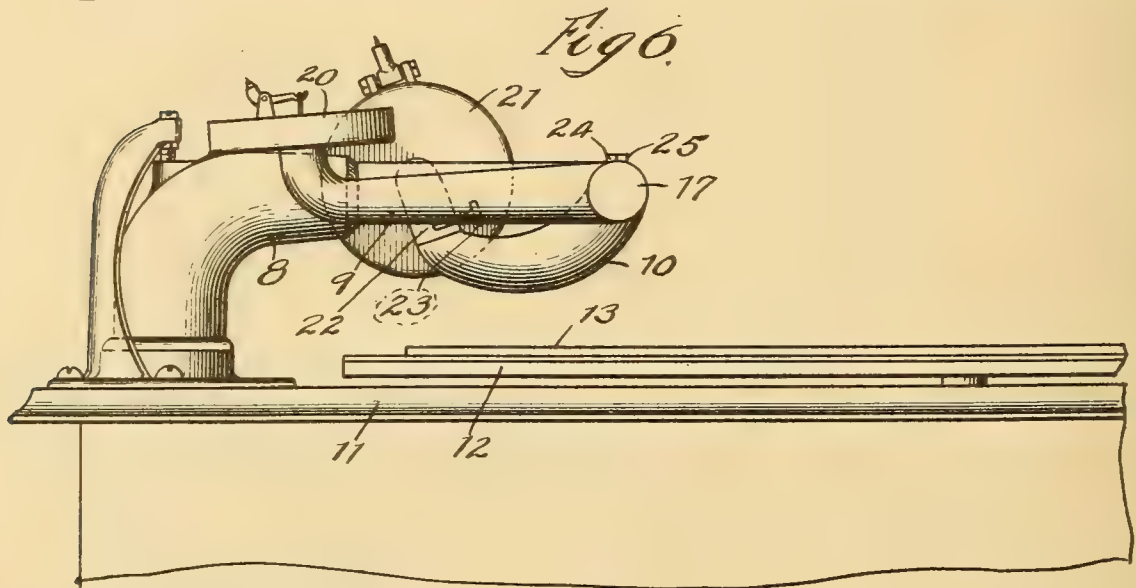
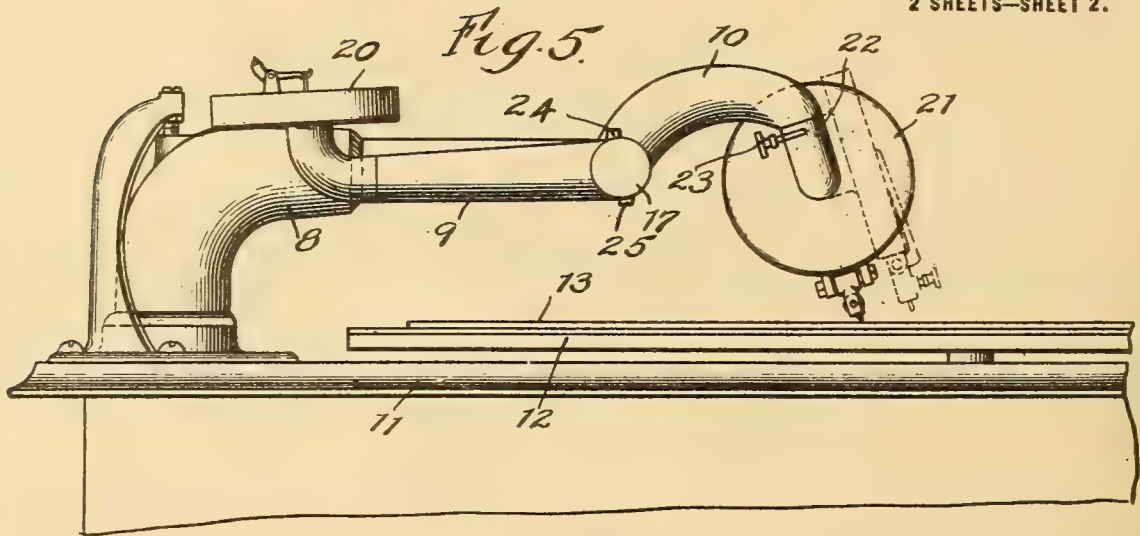
Witnesses.
Carl G. Anderson
M. A. Kiddie

Inventor.
Arthur P. Schwarzkopf
By. Wm. J. Beltratty.

A. R. SCHWARZKOPF.
TALKING MACHINE TONE ARM.
APPLICATION FILED SEPT. 9, 1916.

1,257,939.

Patented Feb. 26, 1918.
2 SHEETS—SHEET 2.



Witnesses:
Carl S. Anderson
M. A. Kiddle

Inventor:
Arthur R. Schwarzkopf
By: Wm. O. Belt atty.

UNITED STATES PATENT OFFICE.

ARTHUR R. SCHWARZKOPF, OF MUSKEGON, MICHIGAN, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

TALKING-MACHINE TONE-ARM.

1,257,939.

Specification of Letters Patent.

Patented Feb. 26, 1918.

Application filed September 9, 1916. Serial No. 119,298.

To all whom it may concern:

Be it known that I, ARTHUR R. SCHWARZKOPF, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Talking-Machine Tone-Arms, of which the following is a specification.

This invention has for its object to provide a universal talking machine tone arm for use with records of both the bottom cut and side cut types and particularly those familiarly known as the Victor, Edison and Pathé records.

A further object of the invention is to dispense with the necessity for detaching any parts of the tone arm when it is desired to play one or the other make of records but to enable this to be done by simply moving parts into and out of operative position and which can be done easily and quickly by any user without special skill or instruction.

A further object of the invention is to proportion and dispose the parts so that the stylus for each type of record will be held in place in the groove under the proper pressure, thereby preserving the desired tone volume and quality.

In the accompanying drawings, illustrating one preferred embodiment of the invention,

Figure 1 is a side elevation showing the invention arranged for playing an Edison record;

Fig. 2 is a top plan view of the invention as shown in Fig. 1;

Figs. 3 and 4 are sectional views on the lines 3—3 and 4—4 of Figs. 2 and 3, respectively;

Fig. 5 shows the invention arranged to play a Victor record;

Fig. 6 shows both sound boxes thrown back in position at rest, and

Fig. 7 is a plan view of the invention as shown in Fig. 6.

The invention comprises a tone arm having a main section 8 and two branch sections 9 and 10 pivotally mounted at the outer end of the main section. The tone arm is mounted on a base 11 which carries the support 12 for the record 13 and is adapted to shift or travel in the usual manner in a horizontal plane above the record and substantially parallel therewith.

In the outer end 8' of the main section 8 of the tone arm there is secured a transverse sleeve 14 which has a side opening 15 communicating with said main section. The branch sections are mounted on the sleeve 14 on opposite sides of the main section and are secured in place by a center bolt 16 having a screw-threaded connection with the heads 17. This sleeve has a side opening 18 which communicates with the branch 10 and a side opening 19 which communicates with the branch 9, the construction being such that when one branch is in inoperative position and the other in operative position, as shown in Figs. 1 and 2, there will be an uninterrupted passage through the branch in operative position and the main section of the tone arm whereas the branch in inoperative position will be shut off at the sleeve from communication with the main section of the tone arm.

The branch section 9 carries a sound box 20 and stylus for playing Edison records; the branch section 10 carries a sound box 21 for playing Victor and Pathé records. The sound box 20 may be rigidly or detachably connected with its branch 9 but the sound box 21 is swiveled at 22 on the outer end of its branch and is secured in adjusted position by a set screw 23. By reason of this swivel connection the sound box 21 may be turned to a position substantially parallel with the branch 10 to play Victor records, as shown in full lines in Fig. 5, or into a position substantially at right angles to the direction of branch 10 to play Pathé records, as shown in broken lines in Fig. 5.

The construction of my invention is such that it can be readily adapted to play any type of record as occasion may require without disconnecting any of the parts and by simply moving the proper sound box into operative position and swinging the other sound box back into inoperative position. The sound box 20 when swung to inoperative position will rest upon the main section of the tone arm, as shown in Figs. 5-7, but I prefer that the sound box 21 shall be turned to the position shown in Figs. 6 and 7 when swung to inoperative position and for this reason I provide a stop 24 on the main section 8 which is engaged by a projection 25 on the branch 10 to limit the rearward movement of said branch and its sound box. In this way I am enabled to re-

duce the height of the device when both branches are folded to inoperative position so that they will readily fit within the cover of the ordinary cabinet and also avoid any interference of one sound box with the other. The proper stylus for playing Victor and Pathé records is secured in the sound box 21 in the usual manner as required.

By proportioning the weight of the sound boxes and the length of the branches and by reason of the swivel connection of the sound box 21 with branch 10, as shown in the drawings, I am enabled to provide the proper weight for all practical purposes required upon the stylus for the different types of records. Thus it will readily be observed that the pressure upon the stylus on the sound box 21 when arranged for playing Victor records will be less than when the sound box is arranged for playing Pathé records. The weight of the sound box 20 is such that it will exert the proper pressure upon the record which is less than that required upon the Edison record which is less than that required for playing Victor and Pathé records. This produces the proper volume and quality of tone from each record the same is if the record were played upon the particular machine for which it is specially designed. When either sound box is swung to inoperative position communication between that branch and the main section is automatically shut off at the sleeve 14 so that there will be no waste of the sound waves through the inoperative branch.

It will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing any of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A talking machine tone arm comprising a main section, a fixed transverse sleeve

centrally mounted on the outer end of said main section and extending beyond said main section on both sides thereof, branch sections each having a portion surrounding the respective ends of said sleeve at opposite sides of said main section, sound boxes carried by said branch sections, said sleeve having an opening communicating with said main section, and an independent opening in said sleeve registering with each branch section only when the same is arranged with its sound box in operative position.

2. A talking machine tone arm comprising a main section, two branch sections, and a transverse sleeve rigidly mounted on the end of the main section upon which said branch sections are pivotally mounted and having an opening communicating therewith and also having openings communicating with said branch sections when in operative position, said communicating openings being automatically closed when the corresponding branch sections are disposed in inoperative position.

3. A talking machine tone arm comprising a main section, a transverse sleeve rigidly mounted on the end of the main section and having a side opening communicating with said main section, and openings on either side of said main section opening and disposed on the opposite side of the sleeve therefrom, and branch sections pivotally mounted on said sleeve over said openings so that when either branch section is in operative position there will be a continuous communication from said branch through said sleeve to the main section, but when either branch section is in inoperative position the opening for said branch will be closed.

ARTHUR R. SCHWARZKOPF.

Witnesses:

CLARENCE A. AHNSTROM.

PETER HOEKENGA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CABINET FOR PHONOGRAPH RECORDS,

1,257,970 ----- E. F. Bergeron,
Filed May 7, 1915,
Patented Mar. 5, 1918.

E. F. BERGERON.
CABINET FOR PHONOGRAPH RECORDS.
APPLICATION FILED MAY 7, 1915.

1,257,970.

Patented Mar. 5, 1918.
2 SHEETS—SHEET 1.

Fig. 1.

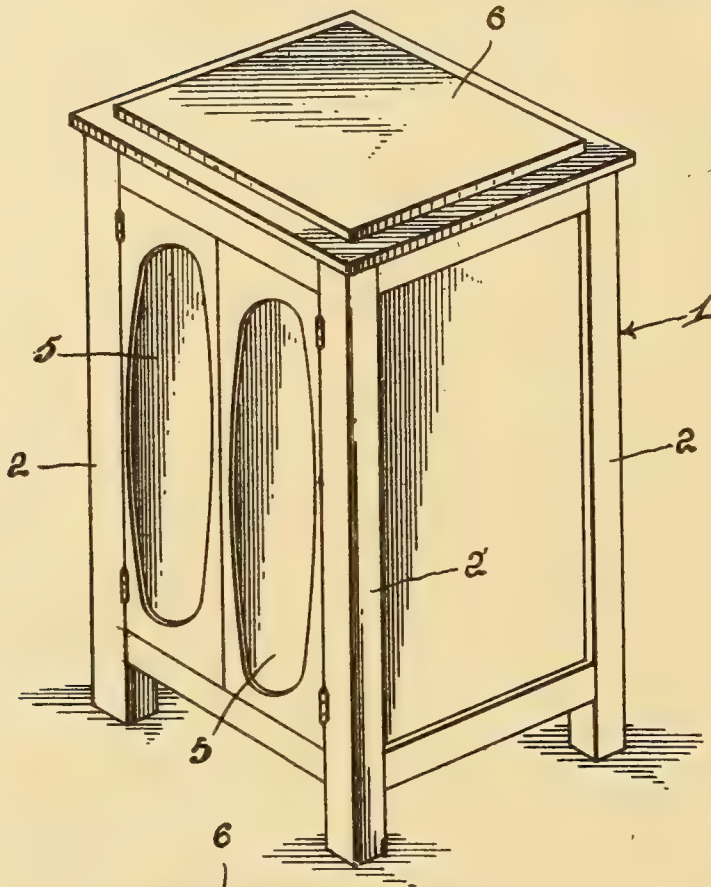
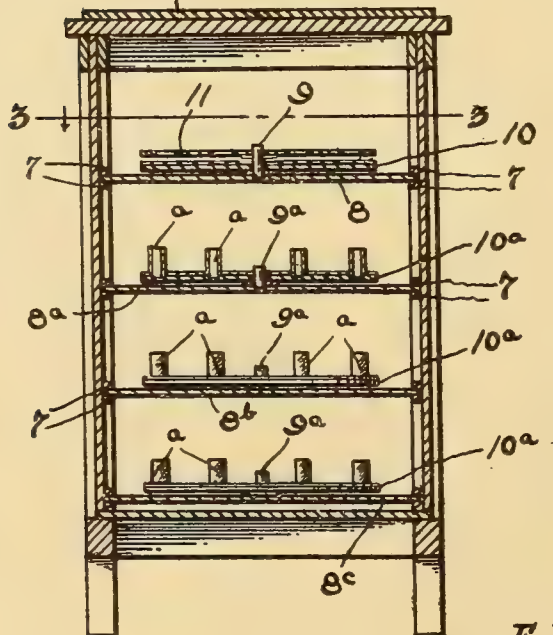


Fig. 2.



Inventor
E. F. Bergeron.

Witnesses
R. F. Veihmeyer.

[Signature]

By *[Signature]* Attorney

E. F. BERGERON.
CABINET FOR PHONOGRAPH RECORDS.
APPLICATION FILED MAY 7, 1915.

1,257,970.

Patented Mar. 5, 1918.
2 SHEETS—SHEET 2.

Fig. 3.

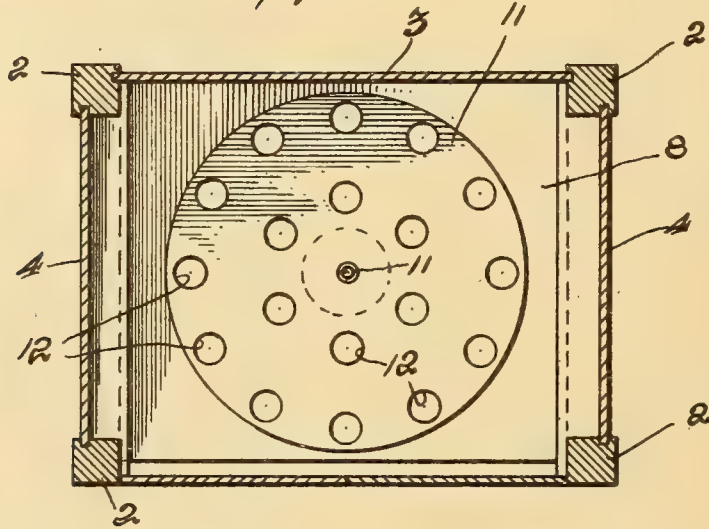


Fig. 4.

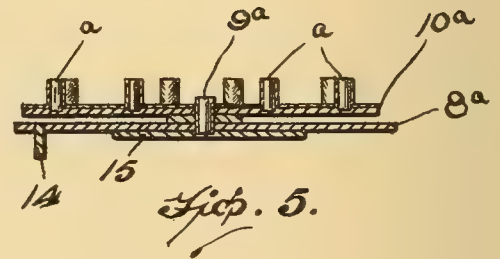
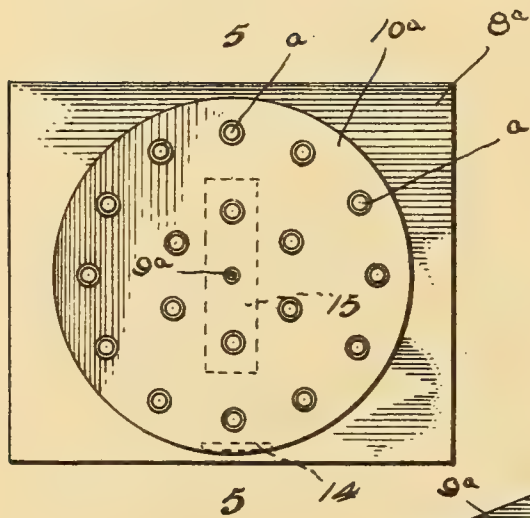
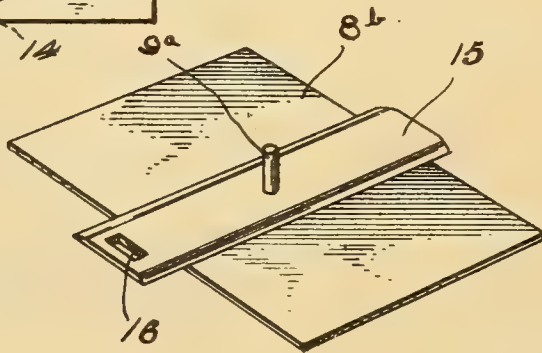


Fig. 6.



Witnesses
R. F. Veihmeyer.

[Signature]

Inventor
E. F. Bergeron.

By *[Signature]* Attorney

UNITED STATES PATENT OFFICE.

EDWARD F. BERGERON, OF SNOHOMISH, WASHINGTON.

CABINET FOR PHONOGRAPH-RECORDS.

1,257,970.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed May 7, 1915. Serial No. 26,592.

To all whom it may concern:

Be it known that I, EDWARD F. BERGERON, a citizen of the United States, residing at Snohomish, in the county of Snohomish and State of Washington, have invented certain new and useful Improvements in Cabinets for Phonograph-Records; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to cabinets for phonograph records, and one of the principal objects of the invention is to provide a cabinet in which cylindrical records may be kept, and said cabinet containing a series of shelves which may be partially withdrawn from the cabinet and said shelves each containing a revolving disk for carrying a number of records which may be inspected without fully withdrawing the shelves, thus reducing the possibility of accident to a minimum.

Another object of the invention is to provide a cabinet having a plurality of shelves mounted to slide therein, and some of the shelves being provided with means for containing cylindrical records in the cartons or cases and other shelves adapted to contain records removed from the cartons.

The foregoing and other objects may be attained by means of the construction illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a cabinet made in accordance with this invention,

Fig. 2 is a vertical section through the same,

Fig. 3 is a horizontal section,

Fig. 4 is a top plan view of one of the shelves and a disk mounted thereon,

Fig. 5 is a horizontal sectional view of the shelf, and

Fig. 6 is a modified form of shelf shown in perspective.

Referring to the drawings, the numeral 1 designates as an entirety a cabinet which may be of any suitable size and form and preferably comprises corner posts 2 which form legs or supports for the cabinet, a back 3, sides 4, and front hinged doors 5, said cabinet being provided with a suitable top 6 which may be used for supporting a phonograph or other articles or devices. Extending from the front to the back are spaced

cleats 7 upon opposite sides of the cabinet, and mounted to slide between the upper pair of cleats 7 is a shelf 8. Mounted on a central pin 9 connected to the shelf 8 is a disk 10, made of any suitable material, and also mounted on the pin 9 is a rotating disk 11 provided with a series of circular openings 12 designed for receiving cylindrical records in their cartons, the disk 11 being spaced from the disk 10 sufficiently to permit the said cartons to extend through the openings 12 and rest upon the disk 10 to hold the cartons firmly in place. This construction will permit the partial withdrawal of the shelf 8 so that upon rotation of the disks 10 and 11 all the records supported thereon can be inspected without danger of breakage, which might result if the shelf was intended to be thoroughly withdrawn. Owing to the rotation of the disks 10 and 11 upon the shelf 8 only a partial withdrawal of the shelf is necessary to give access to all the records.

A shelf 8^a, and similar shelves 8^b and 8^c are mounted to slide in similar cleats 7, said shelves each being provided with a central pin 9^a, and a disk 10^a being mounted to rotate on said pin. Each of the disks 10^a are provided with a plurality of pegs which may be covered with fabric to prevent injury to the cylinders, said pegs *a* projecting up a suitable distance from the disks to hold a cylindrical record in upright position.

Each of the shelves may have a depending finger hold 14, by which the shelf may be readily withdrawn partially from the cabinet, and each of the shelves is provided with a bracing strip 15 extending from front to rear, and which as shown in Fig. 6, may be extended forward to provide a hand hold 16.

From the foregoing it will be obvious that a cabinet made in accordance with this invention may contain a large number of cylindrical records, and the shelves may be partially withdrawn and the disks rotated to give access to any of the cylinders thereon.

Various changes may be made in the details of construction without departing from the spirit and scope of the invention as defined in the claim.

What is claimed is:—

A cabinet of the class described provided

at opposite sides with horizontal ways arranged at intervals, a vertical series of shelves slidable in the said ways, said shelves being provided with central strips
5 secured to the upper faces of the shelves and extending in advance of the shelves and having hand holds at their front projecting portions and provided with upwardly projecting pivot pins arranged centrally of
10 the shelves, a series of disks supported upon the strips and spaced by the same from the shelves and rotatably mounted on the pivot

pins, the spacing of the disks from the shelves permitting them to be readily grasped for rotation and the hand holds 15 enabling the disks and shelves to be readily drawn out of the cabinet, and cylinder supports carried by the disks.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD F. BERGERON.

Witnesses:

MYRON W. TUPPER,
W. M. VISTAL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TAIZING MACHINE.

1,858,128 ———— H. Lubbock,
Filed Apr. 3, 1917,
Patented Mar. 5, 1918.

H. LOBSCHUTZ.
TALKING MACHINE.
APPLICATION FILED APR. 3, 1917.

1,258,128.

Patented Mar. 5, 1918.

Fig. 1

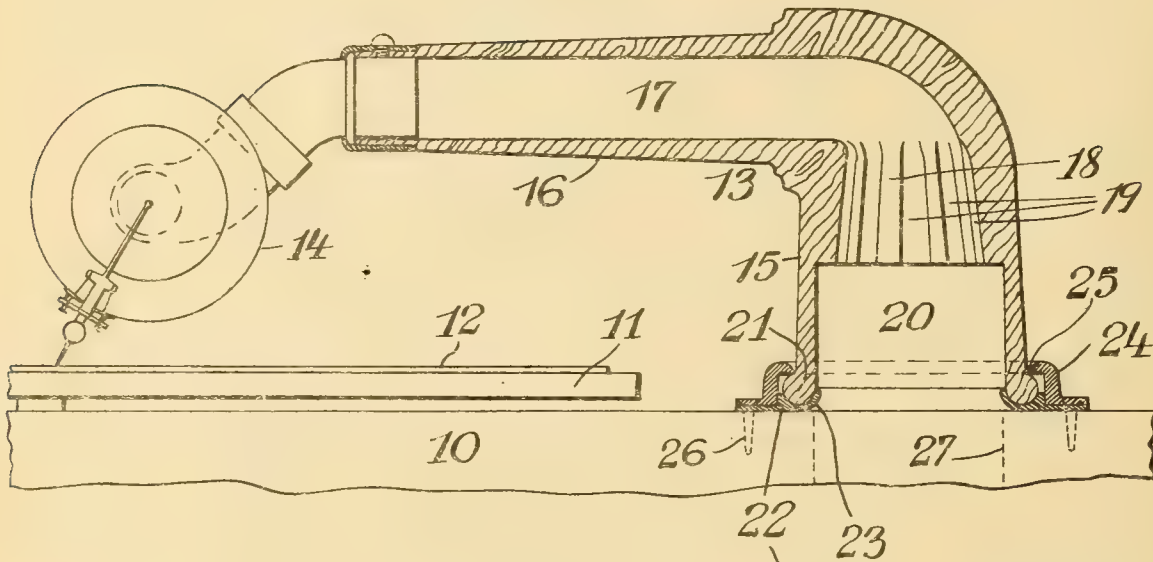
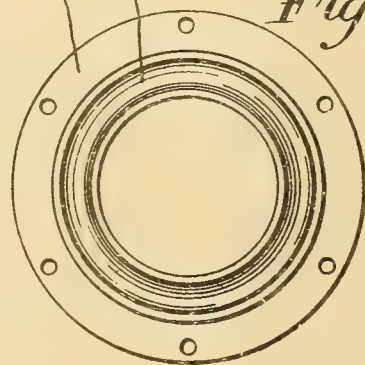


Fig. 2



Inventor
Henry Lobschutz
By his Attorney
Joan E. G. Konigsberg.

UNITED STATES PATENT OFFICE.

HENRY LOBSCHUTZ, OF NEW YORK, N. Y.

TALKING-MACHINE.

1,258,128.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed April 3, 1917. Serial No. 159,590.

To all whom it may concern:

Be it known that I, HENRY LOBSCHUTZ, a citizen of the United States, and resident of New York city, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

The object of my invention is to provide an improved tone arm for talking machines. More particularly it is one of the objects of my invention to provide a tone arm in which the passages for the sound waves are constructed almost entirely of wood. By using a wooden tone arm, the objectionable metallic, harsh or scratching sounds accompanying tone reproduction in talking machines may be almost entirely eliminated and only the tones sought to be reproduced are heard. My invention further provides a wooden tone arm of a certain novel interior construction whereby a clearer and more soft tone reproduction is obtained and which will be pointed out in detail hereinafter.

With these and other objects in view my invention comprises the combinations and arrangements of parts and elements as hereinafter set forth and as illustrated in the accompanying drawing in which—

Figure 1 is a view, partly in section, of a tone arm and sound box embodying my invention;

Fig. 2 is a plan view of the supporting bearing for the tone arm.

Referring to Fig. 1, the talking machine is represented at 10, the turntable at 11 and the record at 12. 13 is the tone arm and 14 the sound box. The tone arm comprises the vertical and horizontal branches 15 and 16 which are formed preferably out of a single piece of hard wood, such as mahogany for instance. The branch 16 is provided with the horizontal straight tone passage 17 which merges into the tapered tone passage 18 which preferably is grooved as shown at 19. 20 designates a tone passage or mouth of the tone arm which is straight and of greater diameter than the tapered portion 18. I have found by experiments that when the tone passages 17, 18 and 20 are shaped as illustrated, a very clear and soft tone reproduction is obtained with very good volume. I have further found that the use

of wood tends to eliminate all foreign sounds or tones because of the absence of vibrations in the walls of the tone passages.

In order to support the tone arm and eliminate friction and undesirable vibrations, the said arm is provided with an annular spherical portion or collar 21 which rests on and is seated in a corresponding annular bearing 22 provided with the spherical or semi-circular annular seat or socket 23 for the reception of the bearing collar portion 21. 24 is a flanged sleeve which surrounds the collar 21 and holds the tone arm on its seat 23. The bearing 22 and the sleeve 24 are both made of hard wood. It will be noted that the tone arm is free to swing horizontally and at the same time permits the sound box 14 to rest upon the record by gravity because of the annular clearance at 25. The members 22 and 24 are secured to the machine by screws 26 and are of course in alignment with the tone passage 27 therein. By mounting the tone arm in the manner indicated, vibration is eliminated and friction is reduced to a minimum.

The invention is susceptible of changes and modifications in the detailed construction set forth without departing from the spirit of the invention and the scope of the appended claim.

I claim:

A tone arm for talking machines made of wood and comprising a horizontal and a vertical branch, said horizontal branch being provided with a straight tone passage, said vertical branch having a vertical tone passage communicating with the passage aforesaid and comprising a tapered portion adjacent said horizontal passage and a straight portion of greater diameter than said tapered portion, said straight portion being further provided on the outside thereof with an annular spherical collar, a wooden bearing having a groove for the reception of said collar and a wooden sleeve for retaining said tone arm on said wooden bearing.

Signed at New York in the county of New York and State of New York this 21st day of March A. D. 1917.

HENRY LOBSCHUTZ.

THE HISTORY OF THE UNITED STATES

OF THE
NORTH AMERICAN CONTINENT

FROM THE FIRST DISCOVERY OF THE CONTINENT
TO THE PRESENT TIME

BY
JAMES OSGOOD

OF THE
FACULTY OF THE
UNIVERSITY OF CALIFORNIA

NEW YORK
PUBLISHED BY
J. OSGOOD

1854

THE HISTORY OF THE UNITED STATES

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J. OSGOOD

1854

SPRING MOTOR

1,258,158 ----- T. J. Sims,
Filed June 16, 1917,
Patented Mar. 5, 1918.

T. J. SIMS.
 SPRING MOTOR.

APPLICATION FILED JUNE 16, 1917.

1,258,158.

Patented Mar. 5, 1918.

2 SHEETS—SHEET 1.

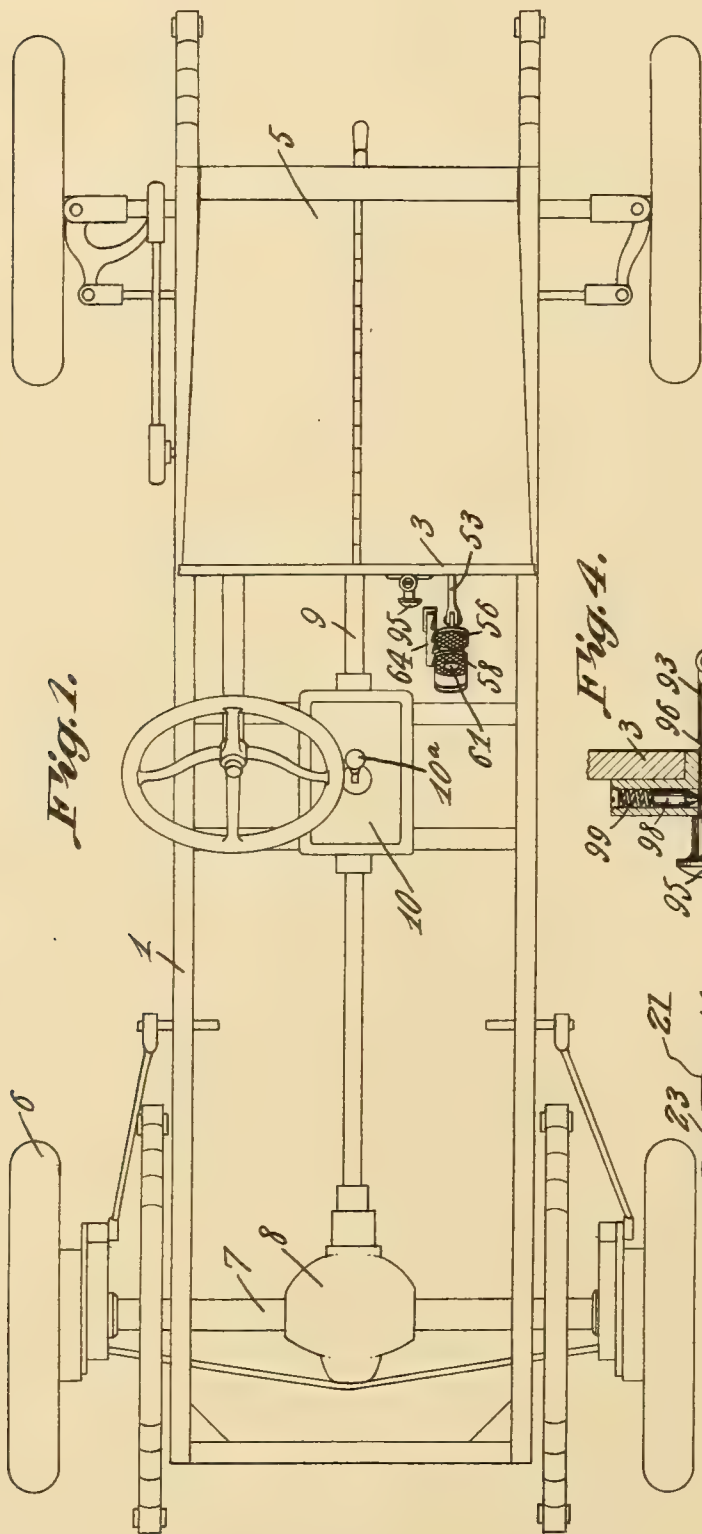


Fig. 1.

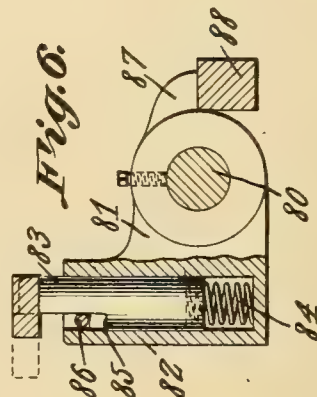


Fig. 6.

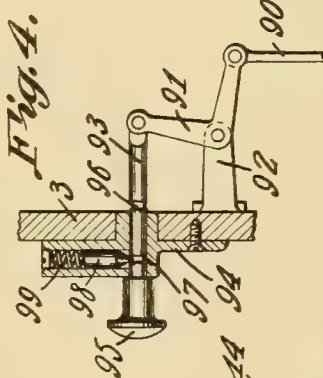


Fig. 4.

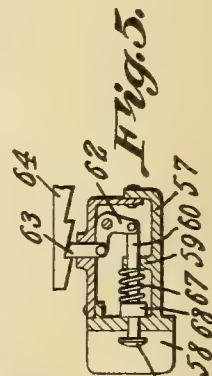


Fig. 5.

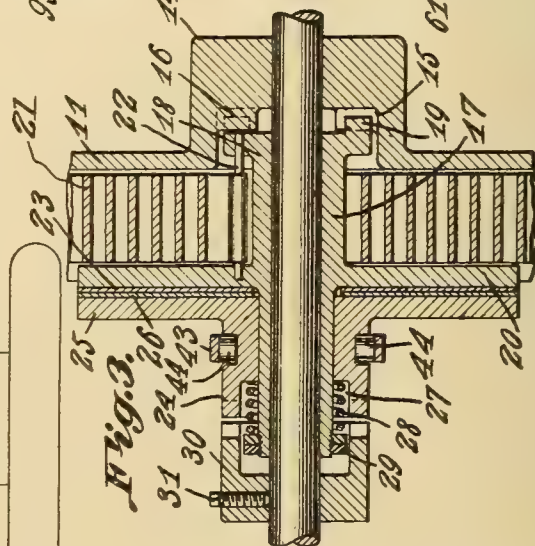


Fig. 3.

Witness

J. R. Tamm
 R. A. Mitchell

Inventor
 T. J. Sims,

By C. A. Snow & Co.

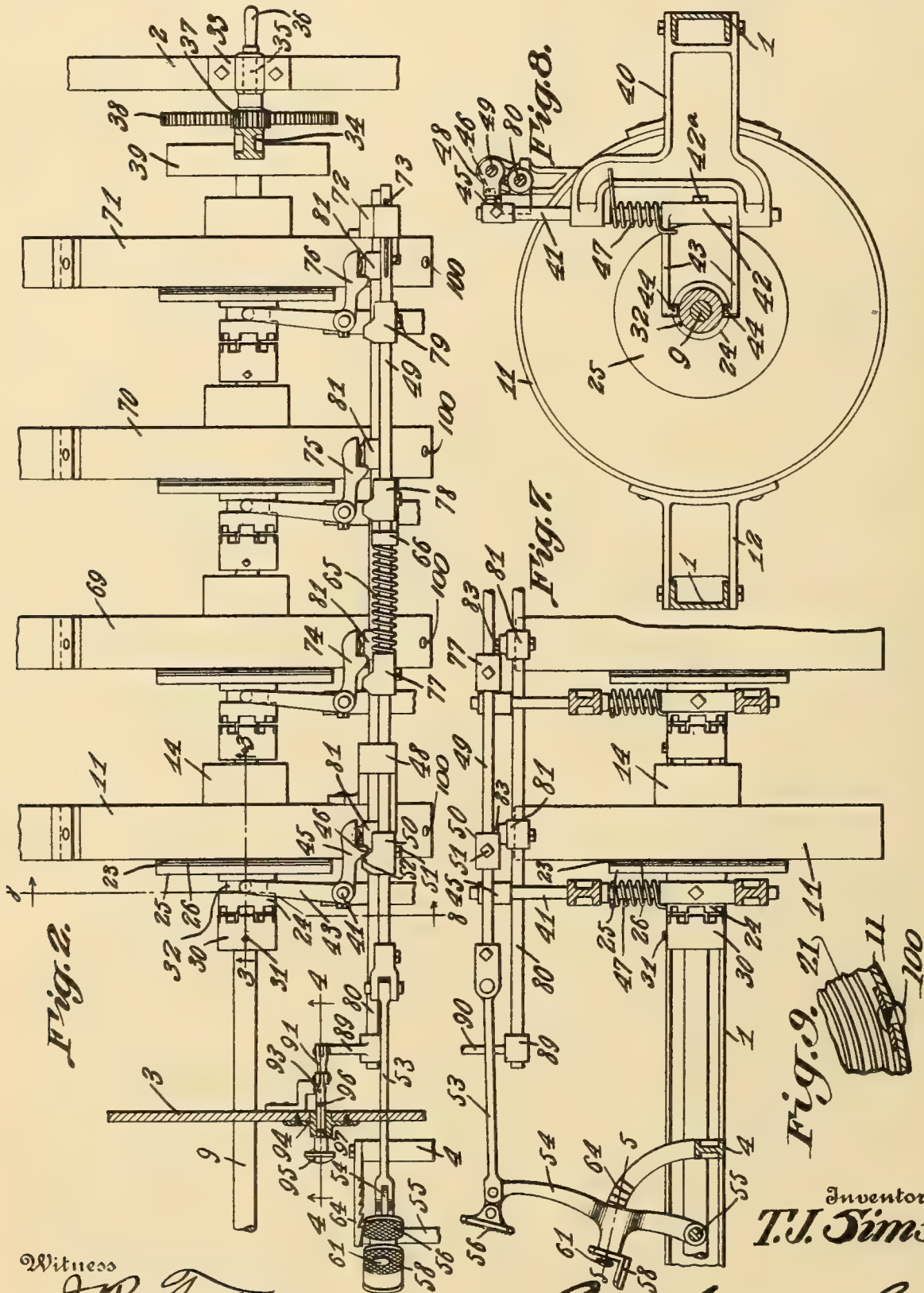
Attorney

T. J. SIMS.
 SPRING MOTOR.
 APPLICATION FILED JUNE 16, 1917.

1,258,158.

Patented Mar. 5, 1918.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

TAYLOR J. SIMS, OF TEAGUE, TEXAS.

SPRING-MOTOR.

1,258,158.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed June 16, 1917. Serial No. 175,107.

To all whom it may concern:

Be it known that I, TAYLOR J. SIMS, a citizen of the United States, residing at Teague, in the county of Freestone and State of Texas, have invented new and useful Spring-Motors, of which the following is a specification.

The device forming the subject matter of this application is a spring propulsion for a vehicle, and one object of the invention is to provide novel means whereby one or more springs may be coupled up with a drive shaft, at the will of an operator, depending upon the amount of driving energy which it is necessary to impart to the shaft.

Another object of the invention is to provide novel means whereby, when one spring becomes exhausted, another spring may be coupled up with the shaft to actuate the same.

Another object of the invention is to provide novel means whereby the springs may be wound up either by hand power, or from a prime mover.

With the above and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:—

Figure 1 shows in top plan, a motor propelled vehicle embodying the present improvements;

Fig. 2 is a fragmental longitudinal section taken through the spring driving mechanism, parts appearing in elevation;

Fig. 3 is a section taken approximately on the line 3—3 of Fig. 2;

Fig. 4 is a sectional detail taken approximately on the line 4—4 of Fig. 2;

Fig. 5 is a section taken on the line 5—5 of Fig. 7;

Fig. 6 is a cross section taken through one of the latch mechanisms;

Fig. 7 is a fragmental side elevation showing a part of the controlling mechanism;

Fig. 8 is a cross section taken approximately on the line 8—8 of Fig. 2;

Fig. 9 is a sectional detail showing the connection for one end of the spring.

In the drawings, the numeral 1 indicates the chassis of a vehicle, the same including a forward bar 2, and an intermediate bar 4. The dashboard is shown at 3 and adjacent the forward end of the vehicle there is a hood 5. The rear wheels are shown at 6 and the rear axle casing appears at 7, the numeral 8 denoting the differential. The numeral 9 marks the drive shaft whereby motion is transmitted to the rear wheels 6 as is common in automobiles. The numeral 10 denotes a transmission mechanism of any desired kind including the usual clutch and its operating means 10^a.

Disposed beneath the hood 5 is an annular spring casing 11 connected with the chassis 1 by means of brackets 12, the casing including a hub 14 having a recess 15 into which projects a clutch element 16 carried by the hub 14. Mounted to move endwise on the shaft 9 is a sleeve 17 having a flange 18 operating in the recess 15. The flange 18 has a clutch element 19 adapted to coact with the clutch element 16 which constitutes a part of the relatively fixed spring casing 11. The sleeve 17 surrounds the shaft 19 and the shaft 19 is journaled in the hub 14. The sleeve 17 includes a disk 20. The outer end of a coiled spring 21 is attached to the casing 11, and the inner end of the spring 21 is secured at 22 to the disk 20 and to the flange 18 which constitute a part of the sleeve 17. The disk 20 has a friction facing 23. Mounted to slide on the sleeve 17 is a clutch member 24 including a disk 25 having a friction facing 26 coöperating with the friction facing 23 of the disk 20. There is a recess 27 in the rear end of the clutch member 24 and in this recess is located a compression spring 28. The forward end of the spring 28 abuts against the clutch member 24, and the rear end of the spring 28 engages an abutment 29 on the rear end of the sleeve 17, the abutment being in the form of a pair of superposed nuts if desired. A clutch member 30 is mounted on the shaft 9 and is secured thereto by a set screw 31 or otherwise. There is a bearing 33 on the forward bar 2, and the numeral 34 denotes a bearing bracket supported in any suitable manner from the rear of the bearing 33. A shaft 35 is journaled in the bearing 33 and in the bracket 34 and may be rotated by means of a crank 36. The shaft 35 carries a small pinion 37 meshing into a larger gear wheel 38 mounted

on the shaft 9. The shaft 9 may also be provided with a pulley 39.

When the clutch 10^a is thrown out, the forward end of the shaft 9 may be rotated, in order to wind up the spring 21, by hand, through a gear train comprising the crank 36, the shaft 35, the pinion 37 and the gear wheel 38, or the shaft 9 may be rotated by power, for the purpose above specified, through the instrumentality of the pulley 39. Noting Fig. 3, it will be seen that when the parts are arranged as shown in the said figure, the spring 21 cannot be wound up when the shaft 9 is rotated, provided that, as shown in the said figure, the clutch elements 19 and 16 are interengaged, it being recalled that the clutch element 16 is a part of the casing 11 and that the casing 11 is fixed to the chassis 1 by the brackets 12. If, however, the sleeve 17 be moved to the left in Fig. 3, until the clutch elements 16 and 19 are out of engagement, and until the clutch members 24 and 30 are in engagement, then, when the shaft 9 is rotated by the crank 36 or the pulley 29, the clutch member 30 will be rotated, the clutch member 24 will be rotated and, through the instrumentality of the friction facings 23 and 26, rotation will be imparted to the disk 20 and consequently to the sleeve 17, thereby winding up the spring 21. The spring 28 presses the friction facings 26 and 23 together with sufficient force so that the spring 21 can be wound up when the shaft 9 is rotated by the crank 36 or the pulley 39, and because the facings 23 and 26 are held together as aforesaid, the spring 21 can react and drive the shaft 9 when the clutch members 24 and 30 are interengaged. Now when the sleeve 17 is shifted to the left, the clutch members 30 and 24 must engage with each other before the clutch elements 19 and 16 are disengaged with each other, since otherwise, the spring 21 would unwind with a run before the clutch members 30 and 24 became interengaged—but if the vehicle is moving, and if the shaft 9 is rotating, and if the clutch elements 19 and 16 are engaged for an instant while the clutch members 24 and 30 are also engaged, something must yield during this instant, and the particular elements which do in fact permit a momentary yielding to avoid a breakage of parts, are the friction facings 26 and 23, which, under a strong and otherwise damaging strain, have relative movement upon each other.

As thus far described, the invention comprises means located adjacent the front of the vehicle, whereby the shaft 9 may be rotated to wind up the spring 21, and a suitable means, shown in Fig. 3, whereby the effort of the spring 21 may be transmitted to the shaft 9 to rotate the rear ground wheels 6.

The means for moving the clutch 24 and

the sleeve 17 together longitudinally of the shaft 9, toward and away from the clutch 30, will now be described.

The numeral 40 denotes a frame carried by one of the chassis bars 1. Journaled for rocking movement in the frame 40 (see Fig. 8) is an upright shaft 41 to which is secured adjustably, as shown at 42^a, a head 42 having lateral arms 43, the movement of the shaft 41 being controlled by a spring 47 coiled around a portion of the shaft, one end of the spring bearing against the frame 40, and the other end of the spring engaging one of the arms 43. The arms 43 have projections 44 received in a circumscribing groove 32 formed in the clutch member 24. Attached to the upper end of the shaft 41 is an arm 45 which extends parallel to the shaft 9. The arm 45 has a lateral outwardly extended projection 46. There is a bearing 48 on the spring casing 11, in which an actuating member, preferably a rod 49, is mounted to slide endwise. A collar 50 is secured adjustably by means of a set screw 51 to the rod 49 and has a projection 52 cooperating with the projection 46 on the arm 45, the parts 46 and 52 being mutually inclined, so as to tilt the arm 45 and rock the shaft 41 readily, when the rod 49 is advanced or moved to the right in Fig. 2. A spring 65 surrounds a part of the rod 49, one end of the spring 65 engaging a suitable abutment 66 which may be carried by the frame of the vehicle. The other end of the spring 65 engages a collar 77 on the rod 49. The collar 77 is a duplicate of the collar 50 and will be alluded to hereinafter. The office of the spring 65 is to move the rod 49 rearwardly or toward the left in Fig. 2. The rear end of the rod 49 is pivoted to a link 53 which in its turn is pivoted to a lever 54 fulcrumed at 55 on one of the chassis bars 1. At its upper end, the lever 54 carries a toe piece 56. The lever 54 includes a casing 57 (see Fig. 5) carrying an angular heel rest 58. The casing 57 has an internal guide 59 in which a plunger 60 is mounted to reciprocate, the plunger passing through the rear end of the casing 57 and including a button 61 accessible to the heel of the operator when the heel of the operator is supported on the rest 58. The forward end of the plunger 60 is pivoted to a bell crank lever 62 fulcrumed in the casing 57, the bell crank lever being connected with a latch 63 slidable in one side of the casing 57 and adapted to coact with a rack 64 which may be supported from the intermediate bar 4. A portion of the plunger 60 is surrounded by a spring 67 which, cooperating with the guide 59 and with an abutment 68, tends to slide the plunger 60 rearwardly.

Let it be supposed that the parts are arranged as shown in Figs. 2 and 7. Then, the heel of the operator, being supported on the

rest 58, advances the plunger 60 by means of the button 61, the spring 67 serving to secure a return of the plunger 60 when pressure on the button 61 is removed. When the plunger 60 is advanced in the manner above described, the bell crank lever 62 is tilted and the latch 63 is withdrawn out of engagement with the rack 64. The operator can now push the lever 54 forwardly at its upper end, this being accomplished by toe pressure exerted on the element 56. In this way, the link 53 and consequently the rod 49 will be advanced. When the rod 49 is advanced, the collar 50 is advanced, and the projection 52 on the collar, cooperating with the projection 46 on the arm 45, swings the arm inwardly, the ends of the projections 46 and 52 being in engagement. When the arm 45 is swung inwardly, the shaft 41 (Fig. 8) is rocked in the frame 40 and the arms 43, through the medium of the projections 44, move the clutch member 24 to the left (Fig. 3), thereby disengaging the clutch elements 19 and 16, and coupling up the clutch elements 24 and 30, in the manner hereinbefore described. When the clutch elements 16 and 19 are disengaged, the spring 21 reacts on the shaft 9 to drive the ground wheels 6, the driving train from the spring 21 to the shaft 9 including the connection 22, the disk 20, the flange 18, the sleeve 17, the clutch member 24 and the clutch member 30, it being observed that during this operation, the spring 28 holds the friction disks 26 and 23 together so that the disk 20 of the sleeve 17 and the disk 25 of the clutch member 24 rotate as one piece. When the clutch member 24 is slid to the left (Fig. 3), the sleeve 17 moves to the left also, the clutch parts 19 and 16 becoming disengaged, the clutch members 24 and 30 becoming interengaged, and the connecting pin 22 sliding endwise through the inner end of the spring 21.

The numerals 69, 70 and 71 denote spring casings like the casing 11, and these casings are provided with mechanisms duplicating those described hereinbefore in detail in connection with the casing 11. At this point it may be noted that the casing 71 is provided with a bearing 72 which, like the bearing 48 constitutes a slidable mounting for the rod 49, the rod 49 being splined at 73 into the bearing 72, so that the rod cannot rotate. The numerals 74, 75 and 76 indicate arms which are individual, respectively, to the casings 69, 70 and 71, and are constructed like the arm 45 on the upper end of the shaft 41 of Fig. 8 and hereinbefore described in detail in connection with the casing 11. The numerals 77, 78 and 79 indicate collars fixed adjustably to the rod 49, like the collar 50, and individual, respectively, to the arms 74, 75 and 76.

The numeral 80 denotes a shaft mounted for rocking movement in the bearings 48

and 72. Secured to the shaft 80 are arms 81 provided with sockets 82. In the sockets 82 latches 83 are mounted for right line sliding movement, the latches being urged outwardly by springs 84 in the sockets, the latches having shoulders 85 cooperating with projections 86 in the sockets, to limit the outward movement of the latches. One of the arms 81 may be provided, as shown in Fig. 6, with a finger 87, cooperating with a projection 88 on the bearing 72, to limit the rotation of the shaft 80 in one direction. The upper ends of the latches 83 operate between the respective arms 45, 74, 75 and 76, and are adapted to be engaged in front of the said arms, in a manner which will be set forth hereinafter. An arm 89 projects inwardly from the rear end of the shaft 80 and is connected by a link 90 to a bell crank 91 (Fig. 4) fulcrumed on the standard 92 carried by the dash board 3. A plunger 93 is pivoted to the bell crank 91 and slides in a casing 94 carried by the dash board, the plunger 93 having an exposed end 95. The plunger 93 has circumscribing seats 96 and 97 adapted to be engaged by a latch 98 mounted in the casing 94 and advanced by a spring 99.

Suppose that the spring 21 has exhausted its force as a means for driving the shaft 9. Then the rod 49 is advanced by the lever 54 until the projection 52 on the collar 50 slides off the projection 46 on the arm 45 and lies in front of the arm. By this operation, the parts will be caused to resume the positions of Fig. 3, the clutch members 30 and 24 being out of engagement, and the shaft 9 rotating in the hub 14 and in the sleeve 17. When the rod 49 is slid forwardly as aforesaid, the collar 77, cooperating with the arm 74, couples up the spring in the casing 69, and this spring now drives the shaft 9. Similarly, the spring in the casing 70, and the spring in the casing 71, one after another, may be made effective to drive the shaft 9, as the springs at the rear, one after another, become exhausted.

Suppose, however, that the spring 21 in the casing 11 has not become exhausted, and that it is desired to supplement the action of this spring by the action of one or more of the springs in the casings 69, 70 and 71. Then, while the arm 45 is swung inwardly, and while the end of the projection 46 of the arm 45 is engaged with the end of the projection 52 on the collar 50, the shaft 80 is rotated by means of the arm 89, the link 90, the bell crank 91 and the plunger 93, the plunger being retracted by means of its end 95, until the latch 98 engages in the seat 96. By this operation, the latch 83 which is individual to the arm 45 will cooperate with the outer edge of the said arm, and hold the same inwardly, thereby preventing the arm from swinging outwardly, and disengaging

the clutches 24 and 30, when the rod 49 and the sleeve 50 are advanced, as described, until the projection 52 on the sleeve 50 lies in front of the projection 46 on the arm 45.

5 When the shaft 80 is rotated as aforesaid, that particular latch 83 which is individual to the arm 74, will engage beneath the arm 74, the movement of the said latch in the corresponding socket 82 being possible, owing to the presence of the spring 84. The operator can now couple up the spring which is individual to the casing 69, by means of the collar 77 and, similarly, through the coöperation of the collar 78 and the arm 75, 10 he can couple up the spring which is individual to the casing 70, and finally, the spring which is individual to the casing 71 may be coupled up, due to the coöperation between the collar 79 and the arm 76. During this operation, the latches 83, one after 15 another, engage the outer edges of the arms 74, 75 and 76 as each spring in advance is coupled to the shaft 9, and prevent a disengagement of the respective clutch elements, corresponding to the parts 30 and 24. Thus, the operator has at his command, not only the spring 21, but, as well, the springs in the casings 69, 70 and 71, one or more of which may be coupled up, to aid the 20 spring 21.

When the occasion for increased driving power has passed, the operator rotates the shaft 80 by means of the arm 89, the link 90, the bell crank 91 and the plunger 93, the 25 latch 98 being engaged in the seat 97, thus swinging all of the latches 83 downwardly, away from the respective arms 45, 74, 75 and 76. The rod 49 may then be pulled rearwardly until the collars 79, 78, 77 and 50 are 30 disposed with respect to the arms 76, 75, 74 and 45, as delineated in Fig. 2, under which circumstances, the springs 21, alone, will operate to drive the shaft 9.

Having thus described the invention, what 35 is claimed is:—

1. A spring motor including a frame; a single driven shaft journaled on the frame; a plurality of springs individual to said single shaft; means for fixing one end of each 40 spring with respect to the frame; means under the control of an operator and accessible from a point remote from the springs for coupling the springs one after another, with the said single shaft; and 45 mechanism under the control of an operator and accessible from a point remote from the springs for disconnecting an exhausted spring from the said single shaft.

2. A spring motor including a frame; a 50 driven shaft journaled on the frame; a spring; a coupling mechanism including coöperating parts and means for connecting the said parts for relative movement under an excessive strain, each of said parts hav- 55 ing a clutch element; a clutch member fixed

with respect to the frame and coöperating with one clutch element; a clutch member carried by the shaft and coöperating with the other clutch element; means for securing one end of the spring with respect to 60 the frame; means for attaching the other end of the spring to one of said parts of the coupling mechanism; and means for moving the coupling mechanism to disengage the clutch element of one of said parts from 65 the clutch member which is fixed with respect to the frame, and for moving, at the same time, the clutch element of the other of said parts into engagement with the clutch member which is carried by the shaft. 70 75 80

3. A spring motor including a frame; a driven shaft journaled on the frame; a spring casing fixed with respect to the frame and provided with a clutch member; a sleeve slidable on the shaft and provided 85 with a clutch element coacting with the clutch member of the casing, the sleeve including a friction disk; a clutch collar movable on the sleeve and including a friction disk coacting with the friction disk of the 90 sleeve; spring means coacting with the clutch collar and with the sleeve to cause the friction disks to coöperate; a clutch member carried by the shaft and coacting with the clutch collar; means for moving 95 the sleeve and the clutch collar together, to disengage the clutch element on the sleeve from the clutch member of the casing, and to engage, at the same time, the clutch collar with the clutch member on the shaft; a 100 spring in the casing and fixed at one end with respect to the casing; and means for connecting the other end of the spring with the sleeve.

4. A spring motor including a frame; a 105 driven shaft journaled on the frame; springs; means for fixing the outer ends of the springs with respect to the frame; clutches uniting the inner ends of the springs with the shaft; mechanism for oper- 110 ating each clutch, to couple the inner ends of the springs with the shaft, each clutch operating mechanism including an arm; separate means under the control of an operator for actuating the arms one after 115 another; and latch mechanisms under the control of an operator and coacting with the arms to cause the clutches to maintain the inner ends of the springs coupled to the shaft after any one of said separate means 120 has moved out of operative relation to the corresponding arm.

5. A spring motor including a frame; a driven shaft journaled on the frame; 125 springs; means for fixing the outer ends of the springs with respect to the frame; clutches uniting the inner ends of the springs with the shaft; mechanism for oper- 130 ating each clutch to couple the inner ends of the springs to the shaft, each clutch oper-

ating mechanism including an arm; mechanism under the control of an operator for swinging the arms one after another to couple the springs to the shaft; yieldably mounted latches individual to the arms, the latches yielding with respect to those arms which have not been swung by said mechanism under the control of an operator, and engaging positively with those latches which have been swung by said mechanism under the control of an operator; and mechanism for actuating all of the latches at once to move the latches into engagement with the arms.

6. A spring motor including a frame; a driven shaft journaled on the frame; springs; means for fixing the outer ends of the springs with respect to the frame; clutches uniting the inner ends of the springs with the shaft; mechanisms for operating each clutch to couple the inner

ends of the springs to the shaft, each clutch operating mechanism including an arm; a rod slidably supported with respect to the frame; projections on the rod and cooperating with the arms to swing the arms one after another; a second shaft supported for rocking movement with respect to the frame; latches eccentrically carried by the second shaft; and mechanism for supporting the latches yieldingly, the latches being engageable positively with respect to those arms which are actuated by the projections on the rod, and being compressible with respect to the remaining arms.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

TAYLOR J. SIMS.

Witnesses:

J. C. DUNN,
L. C. ELY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

FOUNTAIN SPRING LIGHTING.

1,258,182 ————— W. J. CLEVELAND,
Filed May 2, 1917,
Patented Mar. 5, 1918.

W. E. CLEVELAND.
SOUND REPRODUCING MACHINE.
APPLICATION FILED MAY 2, 1917.

1,258,189.

Patented Mar. 5, 1918.
3 SHEETS—SHEET 1.

Fig. 1

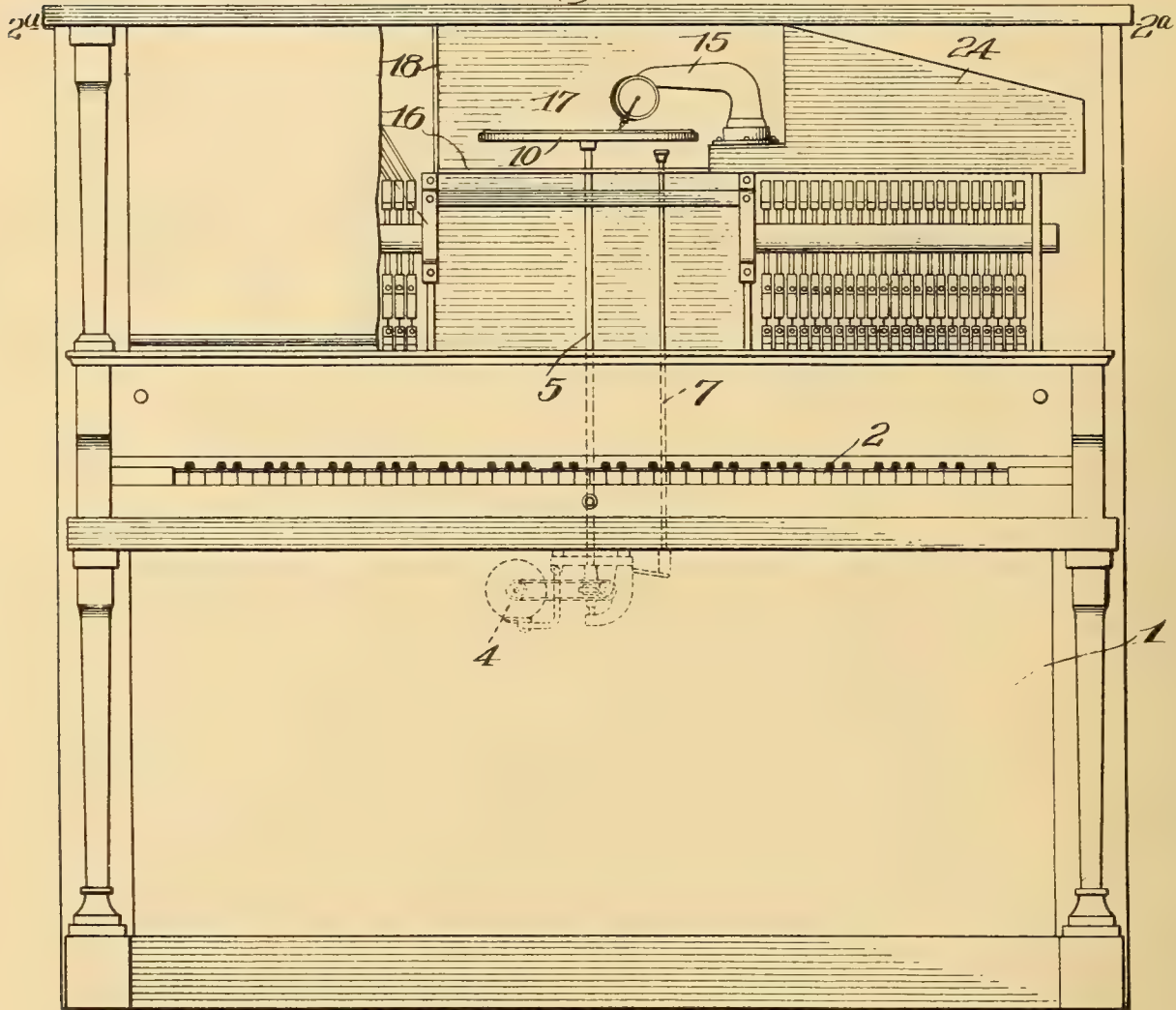
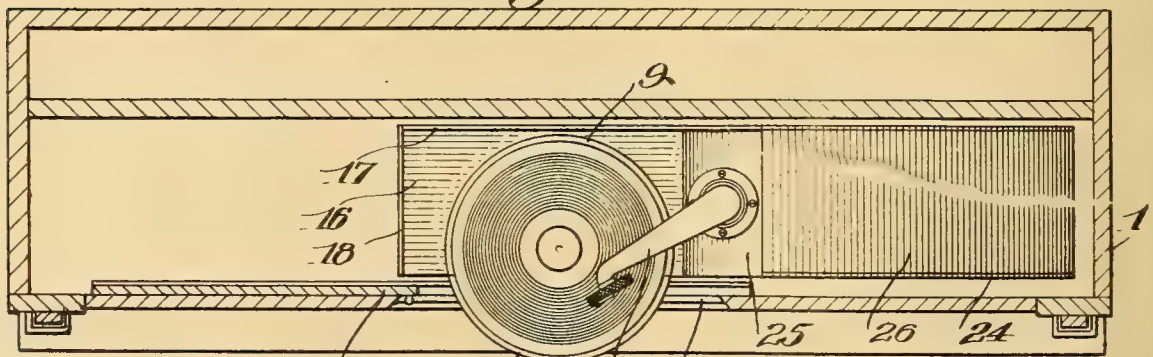


Fig. 2



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3 SHEETS—SHEET 2.

Fig. 3

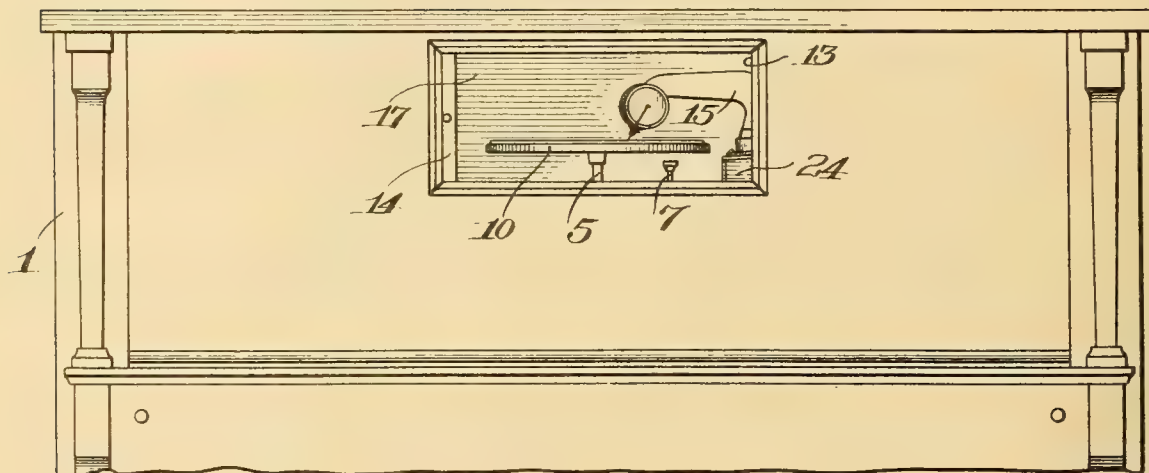


Fig. 4

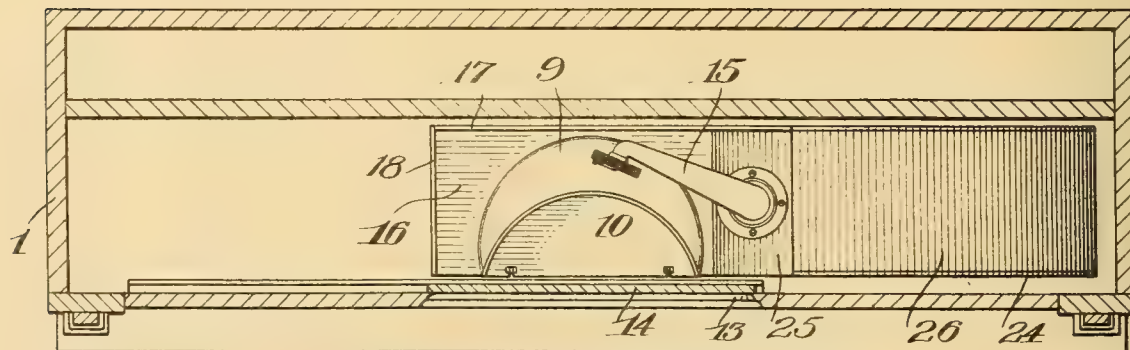
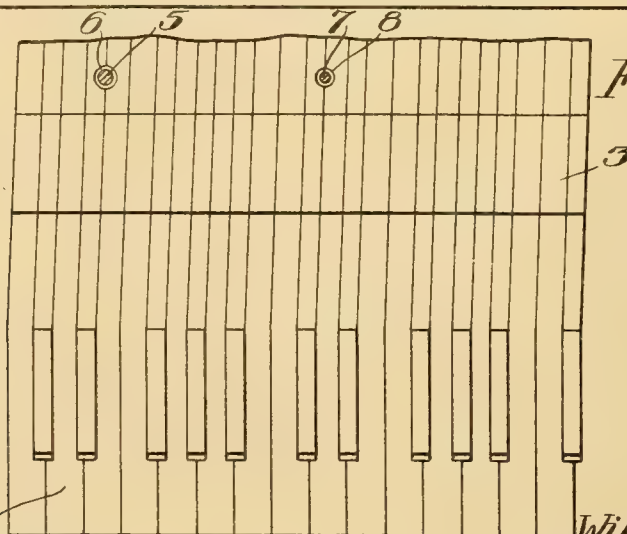


Fig. 5



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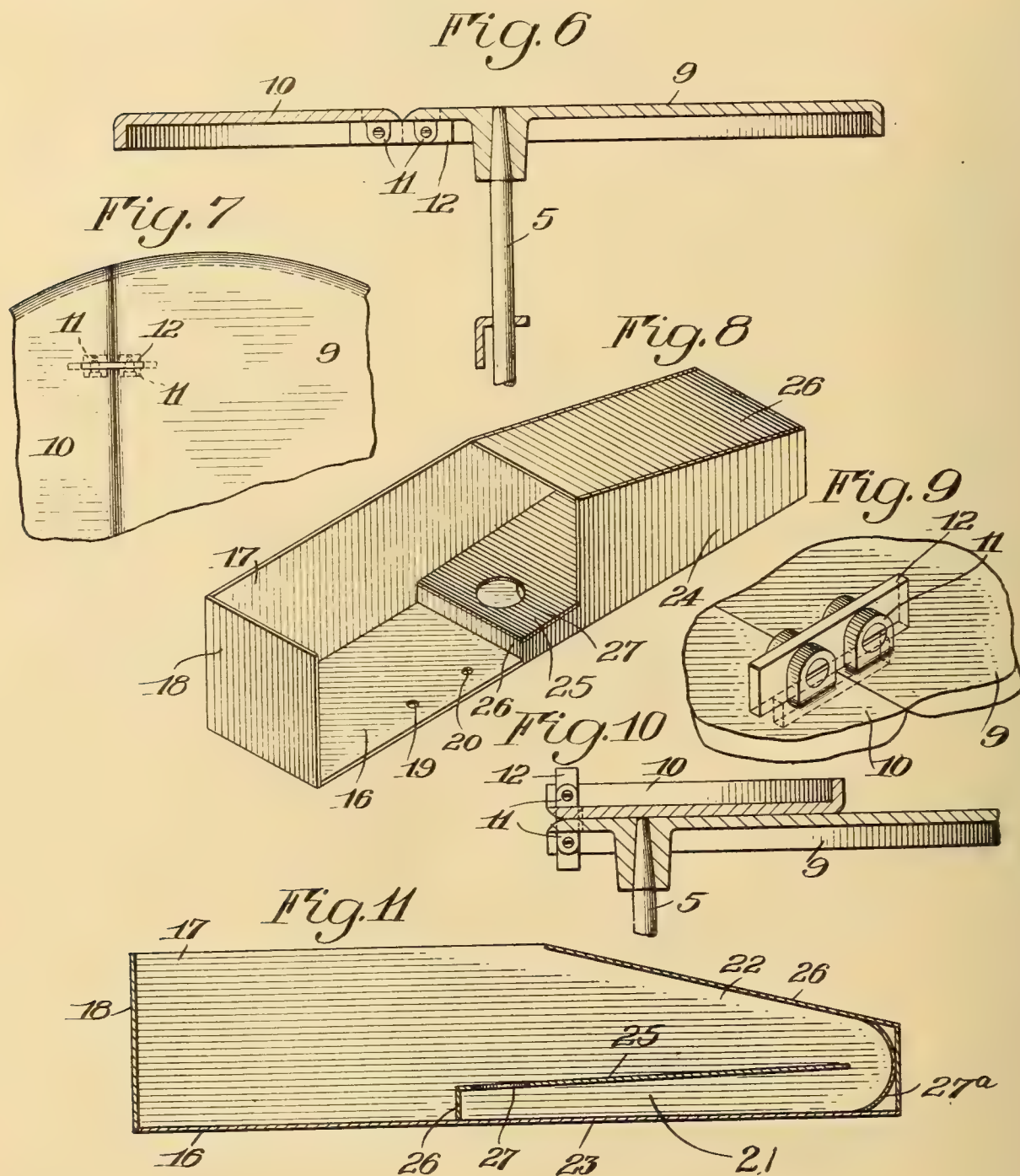
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W. E. CLEVELAND.
SOUND REPRODUCING MACHINE.
APPLICATION FILED MAY 2, 1917.

1,258,189.

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UNITED STATES PATENT OFFICE.

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SOUND-REPRODUCING MACHINE.

1,258,189.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed May 2, 1917. Serial No. 165,823.

To all whom it may concern:

Be it known that I, WILLARD E. CLEVELAND, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Sound-Reproducing Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference characters marked thereon.

My invention has reference to sound reproducing machines and its purpose is more particularly to provide an apparatus that is readily applicable to and used in conjunction with pianos so that a phonograph mechanism may be used either independently of or in conjunction or harmony with a piano. A more especial purpose of the invention is to afford a novel drive or controlling mechanism that permits ready application of the device to a piano structure. Another object of my improvement resides in the novel construction and relationship of the horn to the record table, so as to create a maximum of sound volume and clearness in a minimum space and with due regard to the simplicity of the construction. To these and other ends the invention consists in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a front elevation of a piano, with a portion of the case broken away, and showing the application of a preferred form of my invention;

Fig. 2 is a horizontal sectional view on the line 2^a—2^a of Fig. 1;

Fig. 3 is a front elevation of the upper part of the piano case, with the record table in playing position;

Fig. 4 is a horizontal sectional view showing the position of the record table when out of operation;

Fig. 5 is a plan view of the keys and key levers;

Fig. 6 is a central vertical sectional view of the record table;

Fig. 7 is a plan view of the same partially broken away;

Fig. 8 is a perspective view of the housing and horn for the record table;

Fig. 9 is an enlarged detail view showing the hinge connection between the two parts of the record table;

Fig. 10 is a sectional view taken through the hinge portion of the table and showing the latter in its folded and inoperative position, and

Fig. 11 is a sectional view of the housing and horn for the record table.

Similar reference characters throughout the several views indicate the same parts.

One of the chief objects which I contemplate is to so adapt a sound reproducing machine or phonograph to a piano as not to interfere in any way with the arrangement or structure of the latter, and further to permit the phonograph or parts thereof, to be foldable or movable within the piano case, so that the latter when closed, may entirely house the phonograph mechanism. There are various ways of accomplishing this, and according to the most efficient plan that I have designed, the record table is disposed above the keyboard, in advance of the wires and key hammers, and is operated directly from a motor arranged preferably under the keyboard. In the present embodiment, 1 designates a piano which may be of usual form of upright construction and provided with keys 2 and key levers 3, the latter being operatively connected to hammers as usual in this class of instruments.

4 designates diagrammatically the driving motor which may be electrically or otherwise operated and is arranged under the keyboard as indicated in Fig. 1. The motor 4 drives a vertically arranged shaft 5 which extends through an opening formed by recesses 6 in a pair of adjacent key levers 3, thence upwardly above the keyboard, carrying at its uppermost end a record table as shown in Fig. 1. 7 is controlling rod for governing the motor 4 and extends upwardly through an opening 8 formed in the key levers 3 and having its upper end conveniently located in proximity to the record table as shown in Fig. 3.

It is desirable that the phonograph mechanism, that is to say, the motor and reproducing arm and coördinate parts be entirely housed within the piano case when not in use, and with this in view, I arrange the

vertical shaft 5 within the piano case and employ a foldable record table which can be moved entirely within the case when not in use. The said table comprises a stationary section 9 and a movable section 10 that is hinged to it in any suitable way as by means of lugs 11 and connecting bar 12. The shaft 5 which supports the record table is arranged behind an opening 13 at the front of the piano case, which opening may be closed by a slidable door 14. When the door 14 is opened, the movable section 10 of the record table is swung forwardly and projects through said opening to hold a record as shown in Fig. 2, and when not in operation, the movable section 10 is moved rearwardly upon the stationary section 9 as shown in Fig. 4, thus permitting the door 14 to be closed.

15 designates the reproducer arm which may be of any conventional type and is connected with a horn of novel construction that will now be described. The horn is formed at one end of a housing, the opposite end of which receives the record table, and comprises a bottom wall 16, rear wall 17 and end wall 18, the openings 19 and 20 being provided to receive the shaft 5 and rod 7 aforementioned. The horn includes a sound receiving and conducting passage consisting of an inlet portion 21 and outlet portion 22 arranged preferably adjacent to one another and extending alternately in opposite directions. The inlet portion 21 of the sound passage is formed by bottom wall 23, side walls 24, top wall 25 and end walls 26 and 27^a, the latter being curved and serving as a deflector for transferring the sound readily from the inlet portion 21 to the outlet portion 22. The inlet and outlet portions of the passage are separated from each other preferably by the aforementioned wall 25, which slants away from the bottom wall 23 so as to give the inlet portion of the passage a constantly increasing cross sectional area. The outlet portion 22 of the sound conducting passage is formed by the side walls 24, bottom wall 25 and upwardly slanting wall 26, giving an arrangement that affords a constantly increasing cross section and terminating in a large mouth from which the sound is finally discharged. The reproducer arm 15 is connected with the inlet portion 21 through opening 27, whereby the sounds are conducted along the inlet portion of the passage in one direction and are then deflected by the wall 27^a and carried in a reverse direction along passage 22, and finally emitted from the mouth of the horn directly into the

zone of the record table as shown in Fig. 1. The sounds being thus discharged about the reproducer arm and table serve more or less to drown or smother any mechanical sound from contact of a needle with the record, and the sounds are then thrown outwardly from the machine by the walls 17 and 18.

With an instrument arranged as described above, sounds from a record will be thrown into a room in the direction of or to approximately the point of location of a person engaged in playing a piano, and this permits a very successful combination of music from the piano and from the phonograph, one accompanying the other. Thus the effect can readily be created of a person singing, and at the same time playing the song accompaniment, and the singing tones, while seeming to emanate from the piano operator, actually come from the phonograph mechanism.

I claim as my invention:

1. In a sound reproducing machine, the combination with a piano keyboard, of a record table disposed above the keyboard, a motor located beneath the keyboard, and a vertically arranged motor driven shaft extending from beneath the keyboard upwardly above the keyboard and supporting said record table at its upper end.
2. In a sound reproducing machine, the combination with a piano keyboard and key levers, of a record table disposed above the keyboard, a motor located beneath the keyboard, and a vertically arranged motor driven shaft extending through an opening formed by recesses in a pair of adjacent key levers, the shaft extending from beneath the keyboard upwardly above the keyboard and supporting said record table at its upper end.
3. In a sound reproducing machine, the combination with a case having an opening at its front, of a record table which projects partially through the opening when in playing position and is foldable within the case when not in operation.
4. In a sound reproducing machine, the combination with a case having an opening at its front, of a record table comprising two sections, one of which is foldable upon the other and movable to a position partially outside the case when in playing position and adapted to be housed entirely within the case when not in operation.
5. A sound reproducing machine including a record table which is collapsible when not in use.

WILLARD E. CLEVELAND.

TALKING MACHINE SOUND-RECORDING.

1,238,141 ——— W. F. Jones,
Filed July 2, 1917,
Patented Mar. 5, 1919.

T. F. JONES.
TALKING MACHINE SOUND BOX.
APPLICATION FILED JULY 2, 1917.

1,258,341.

Patented Mar. 5, 1918.

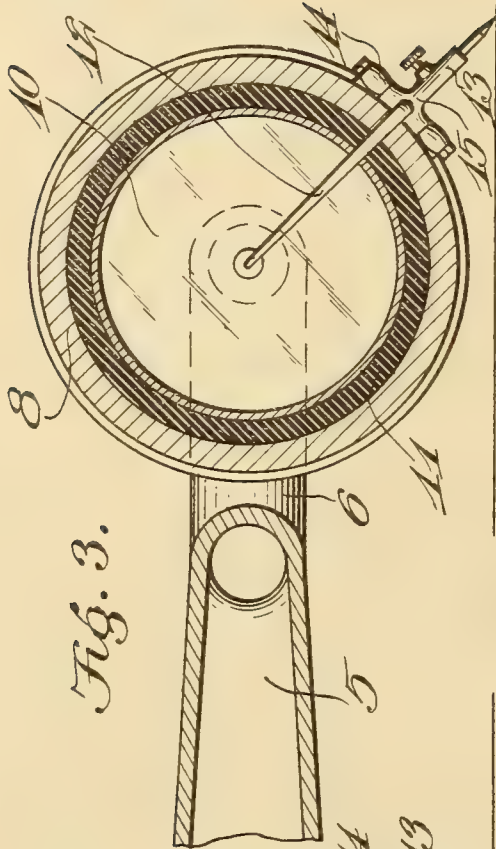


Fig. 1.

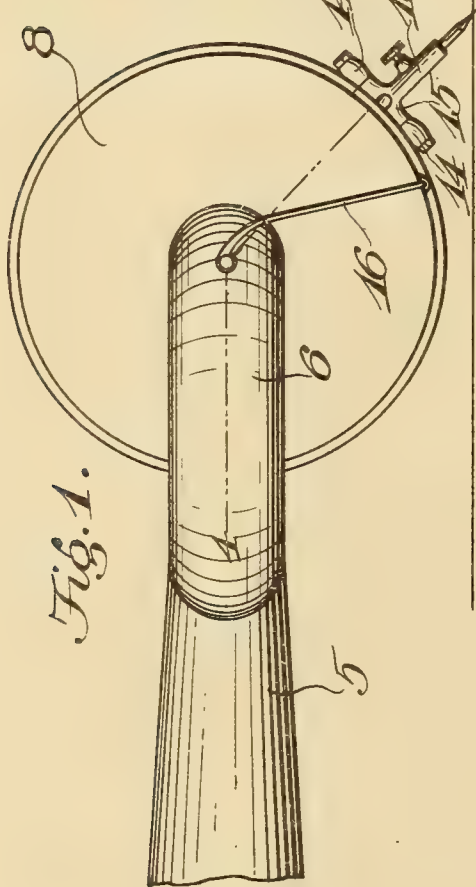


Fig. 2.

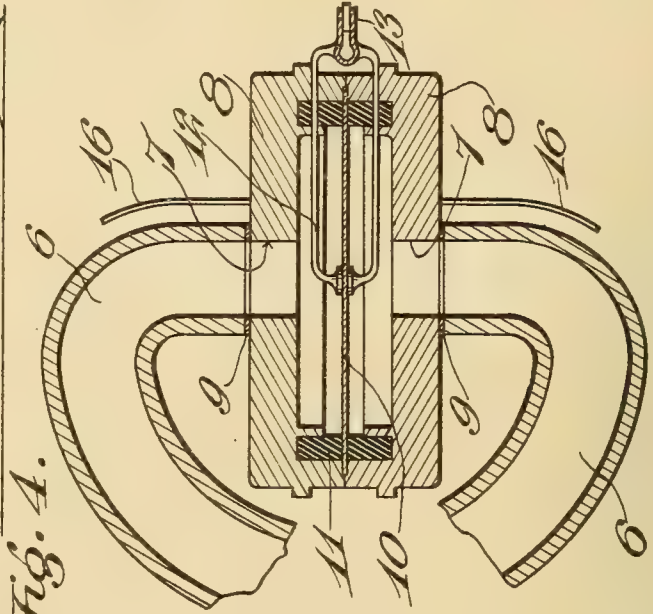
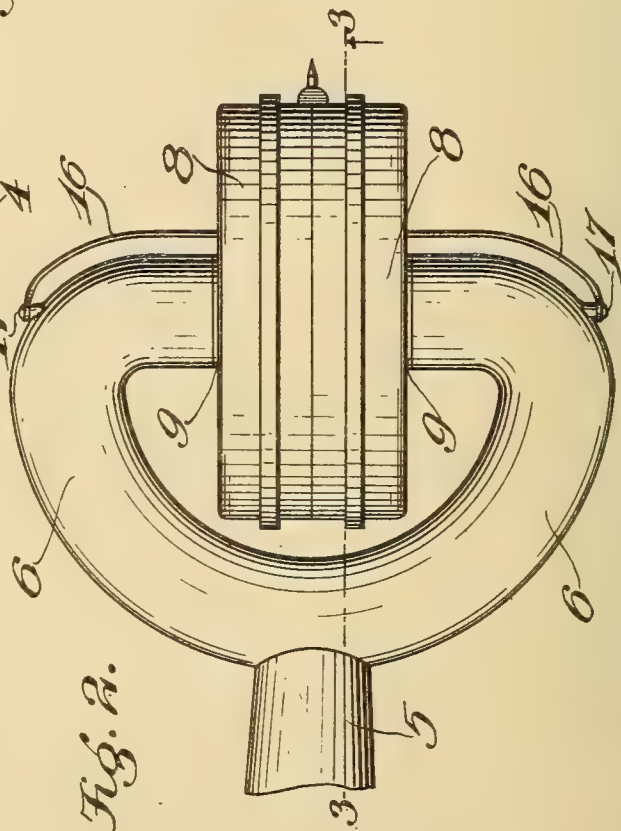


Fig. 3.



Thomas F. Jones
INVENTOR.

BY *Wm. A. Thomas & Co.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS F. JONES, OF MAYWOOD, ILLINOIS.

TALKING-MACHINE SOUND-BOX.

1,258,341.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed July 2, 1917. Serial No. 178,165.

To all whom it may concern:

Be it known that I, THOMAS F. JONES, a citizen of the United States, residing at Maywood, in the county of Cook and State of Illinois, have invented new and useful Improvements in Talking-Machine Sound-Boxes, of which the following is a specification.

This invention relates to sound boxes of talking machines, and its object is to provide a novel and improved mounting therefor whereby it is free to rotate about its own axis rather than swing bodily about an axis outside of itself, this arrangement resulting in certain advantages to be hereinafter pointed out.

In order that the invention may be better understood, reference is had to the accompanying drawing, forming a part of this specification and in said drawing,

Figure 1 is a side elevation of a fragment of the tone arm of a talking machine and the sound box carried thereby;

Fig. 2 is a plan view thereof;

Fig. 3 is a section on the line 3—3 of Fig. 2, and

Fig. 4 is a section on the line 4—4 of Fig. 1.

Referring specifically to the drawing 5 denotes the tone arm of a talking machine having at its outer end a yoke, the branches 6 of which open into central apertures 7 in the opposite side walls 8 of the sound box. Between the walls 8 and extremities of the yoke branches 6 are interposed felt washers 9 to retain the sound and to absorb jar. The sound box is in two sections formed by the walls 8 and the diaphragm 10 is held therebetween by rubber clamping rings 11. The diaphragm 10 has the usual connections 12 with the stylus holder 13. On the sound box are ears 14 carrying pivot screws which engage the trunnions 15 on the stylus holder. The sound box is supported by two arms 16 pivoted at 17 to the yoke branches 6.

As shown in Figs. 2 and 4 of the drawing the outer ends of the yoke branches 6 have inward bends coinciding with the center of the sound box, between the extremities of which bends the sound box is located. The

pivots 17 of the arms 16 coincide with the axis of the bends of the yoke branches and are therefore in the center line of the sound box. Hence it will be seen that the sound box is rotatably supported on an axis coinciding with its center, and it does not swing bodily about a pivot outside of itself as in the conventional types of talking machines, causing the record disk to bear the weight of the sound box. By supporting the sound box so that it can turn about its own axis, it can be easily turned for access to the stylus, and at the same time the record disk is relieved of the weight of the sound box. The weight on the stylus is also reduced to a minimum, and the load on the motor which turns the record disk is also reduced, resulting in an increased or lengthened utility and life of the stylus, and reducing wear of the record disk. The record disk is also safe from injury by accidental dropping of the sound box. There is also an increased volume of sound and musical overtones, and surface friction or scratching is reduced to a minimum. The weight of the sound box may be increased, thereby forcing all vibrations to the diaphragm. The compensation of the sound box is axial instead of radial, that is to say, the compensation is secured by the sound box turning upon an axis the center of which passes through the center of the diaphragm. This method of suspension of the sound box will allow or compensate for inequalities in the record disk, or the motion of the turntable carrying the latter. Sound boxes having a radial suspension also do this, but with less efficiency, for the reason that by a radial suspension more weight is placed on the needle. The light pressure on the needle resulting from the axial suspension of the sound box will more readily absorb the inequalities hereinbefore mentioned, or compensate for them.

I claim:

1. The combination with a talking machine tone arm having laterally extending branches at its outer ends terminating in inward bends; of a sound box rotatably positioned between the extremities of said bends, and a pair of supporting arms con-

nected to opposite sides of the sound box and pivoted to the aforesaid branches in line with the center of the sound box.

2. The combination with a talking machine tone arm having laterally extending branches at its outer ends; of a sound box rotatably located between said branches, and

supporting arms for the sound box fastened to the latter on opposite sides thereof and pivotally connected to the aforesaid branches in line with the center of the sound box. 10

In testimony whereof I affix my signature.

THOMAS F. JONES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RECORD FILING MECHANISM.

1,258,498 ----- W. Stuebing & L. J. Van Guelpen,
Filed Mar. 17, 1916,
Patented Mar. 5, 1918.

W. STUEBING, JR. & L. J. VAN GUELPEN.

RECORD FILING MECHANISM.

APPLICATION FILED MAR. 17, 1916.

1,258,498.

Patented Mar. 5, 1918.

3 SHEETS—SHEET 1.

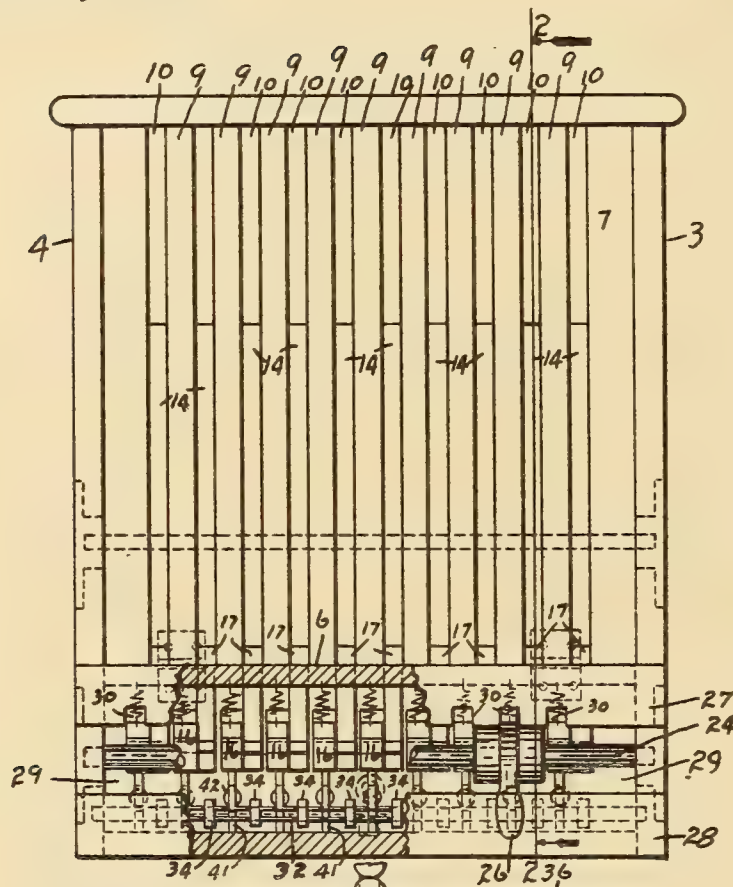


Fig. 1.

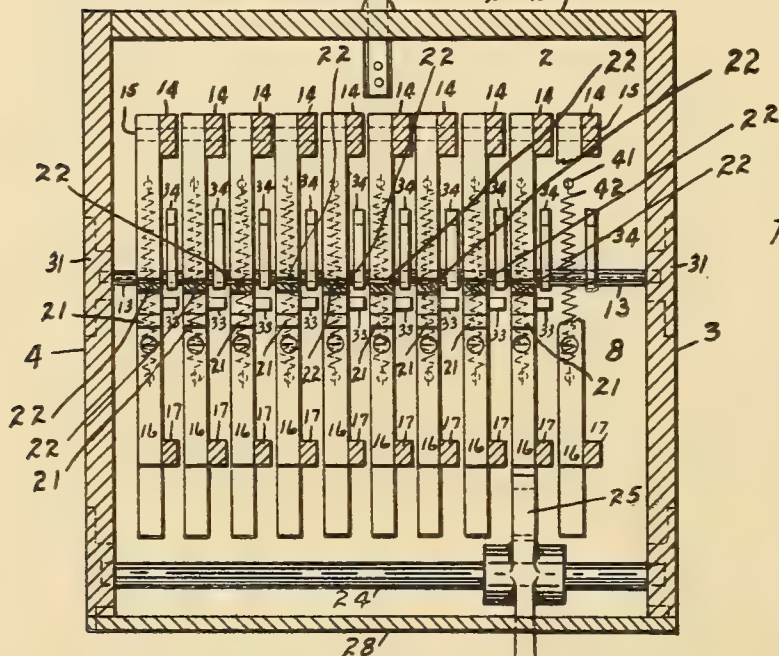



Fig. 4.

Witnesses
L. M. Darnall
W. E. Stuckey

 26 Inventor
 William F. Fieber Jr.
 and John F. Fieber
 3 John F. Fieber et al
 Attorney

W. STUEBING, JR. & L. J. VAN GUELPEN.

RECORD FILING MECHANISM.

APPLICATION FILED MAR. 17, 1916.

1,258,498.

Patented Mar. 5, 1918.

3 SHEETS—SHEET 2.

Fig. 2.

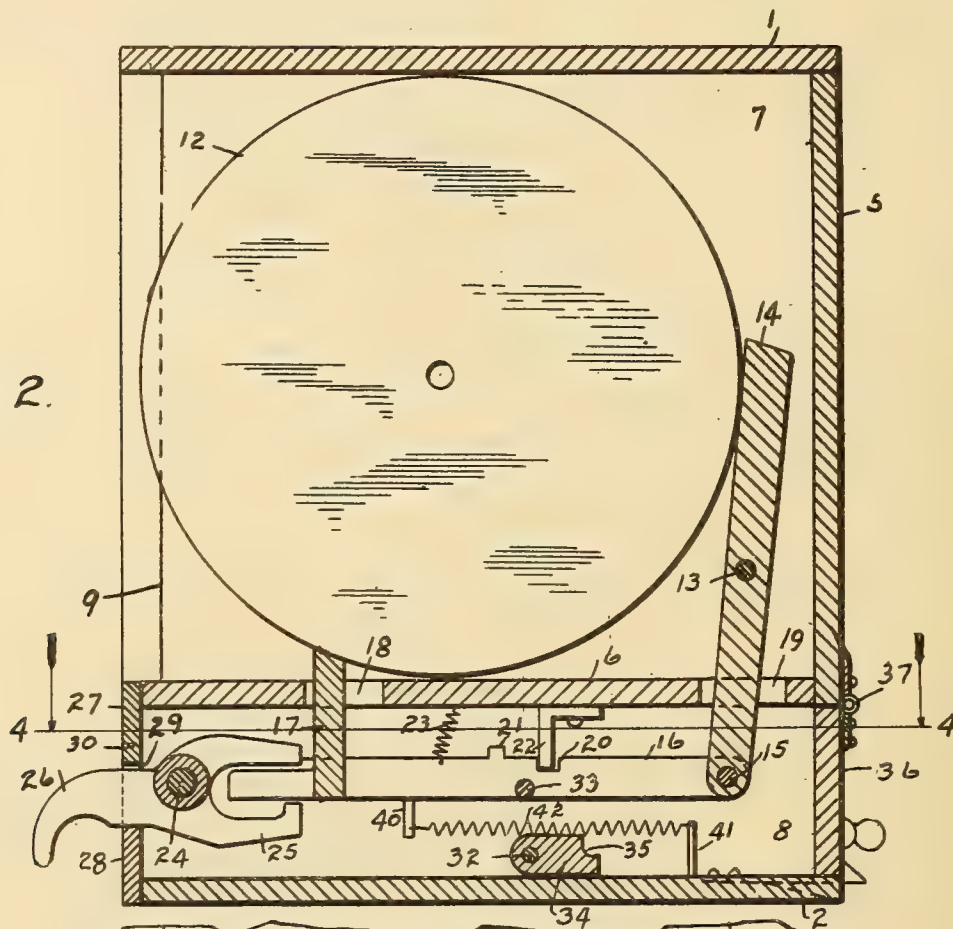
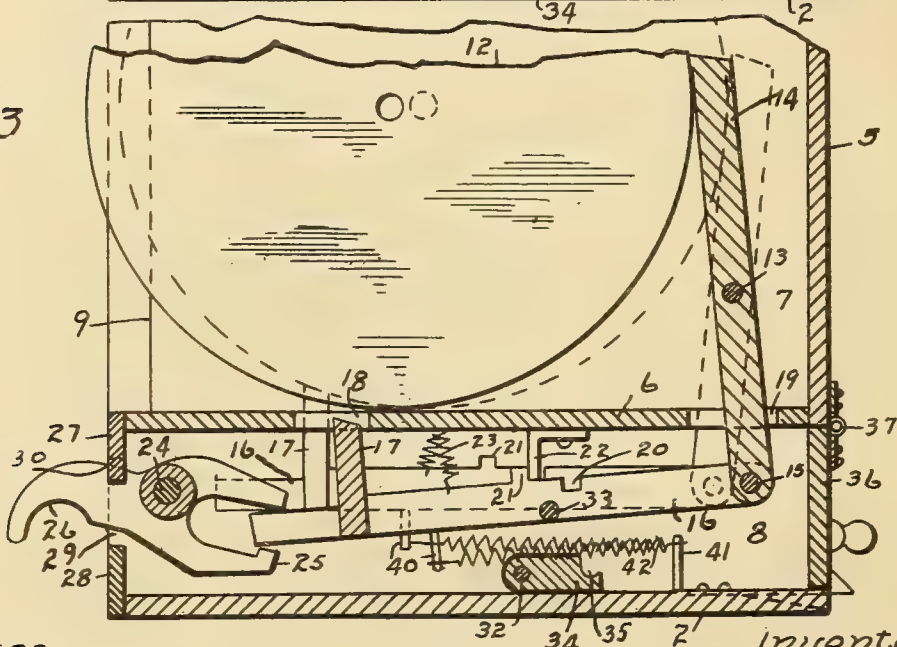


Fig. 3



Witnesses
L. M. Dymally
W. C. Stuebing

Inventor
William Stuebing Jr.
and Louis Van Guelpen
by John J. Stuebing
Attorney

W. STUEBING, JR. & L. J. VAN GUELPEN.

RECORD FILING MECHANISM.

APPLICATION FILED MAR. 17, 1916.

1,258,498.

Patented Mar. 5, 1918.

3 SHEETS—SHEET 3.

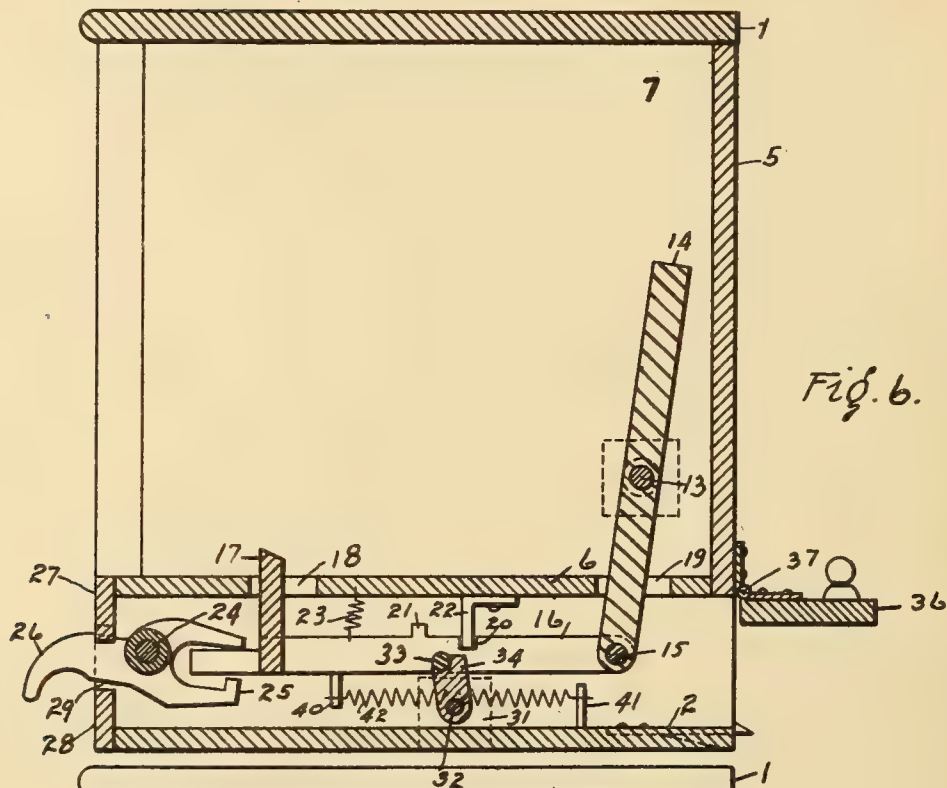


Fig. 6.

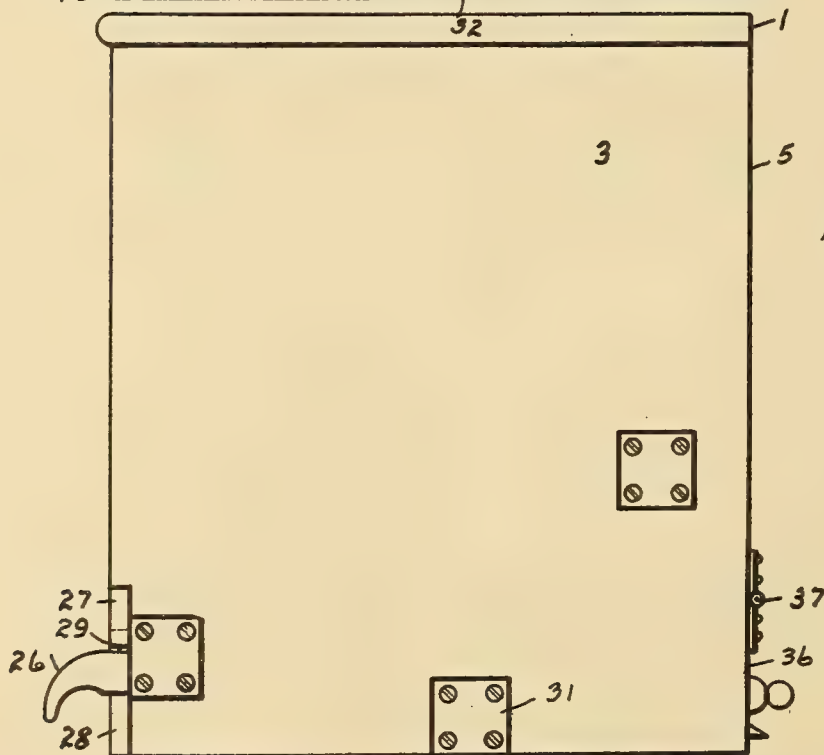


Fig. 5.

Witnesses

L. M. Dyer
W. C. Stuebing

Inventor

William Stuebing Jr.
and Louis Van Guelpen
by John H. Miller
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM STUEBING, JR., AND LOUIS J. VAN GUELPEN, OF CINCINNATI, OHIO, ASSIGNORS OF SEVEN-SIXTEENTHS TO SAID STUEBING, TWO-SIXTEENTHS TO SAID VAN GUELPEN, AND SEVEN-SIXTEENTHS TO L. A. BURRELL, OF CINCINNATI, OHIO.

RECORD-FILING MECHANISM.

1,258,498.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed March 17, 1916. Serial No. 84,877.

To all whom it may concern:

Be it known that we, WILLIAM STUEBING, Jr., and LOUIS J. VAN GUELPEN, both citizens of the United States, and each residing at the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Record-Filing Mechanism, of which the following is a specification.

10 The object of our invention is to provide a simple, cheap, unique and highly efficient mechanism for filing records; and its salient features lie in providing novel mechanism for withdrawing and filing the record.

15 One of its features consists in the employment of a case or cabinet, divided into spaced divisions or compartments, each adapted to hold a record, and in providing mechanism in connection with each of said compartments or divisions to be used for receiving the record and for ejecting it, which mechanism, however, can not be used in any of the compartments without placing said mechanism for the compartment to be used, 25 in operative condition by human agency.

Another feature consists in providing mechanism for locking the record in the compartment automatically and automatically ejecting the same.

30 Another feature consists in providing means for preventing the insertion of a record in any of the compartments or divisions except in the one which has been removed, and when said record is inserted in its compartment and automatically locked in place, none of the records can be removed until separately operated upon by the mechanism for releasing the record; thus preventing taking out of more than one record at a time, thus forcing the operator to take out the records singly and replace the record before taking out another; thus preventing the operator from laying the records around promiscuously, thus saving time and preventing inconvenience in hunting the desired record and preventing loss, destruction and breakage.

Another feature consists in prohibiting the use of any of the compartments for which there are no records, by making the mechanism for said unused compartments inoperative, at will.

Another feature consists in providing mechanism which can be shifted to the oper-

ating mechanism of any of the compartments so as to operate the desired compartment separately to procure the desired record.

Another feature consists in making the withdrawn record the key for automatically locking itself back into the compartment from which it has been removed, and automatically releasing the shifting mechanism so that it will be again free to operate the mechanism of another compartment.

It will be readily understood that our device and its mechanism can be used in connection with any cabinet or filing case from which records of any kind are withdrawn and inserted, but for the purpose of perspicuity and reference, we will describe it in connection with the filing cabinet of a talking machine, without, however, limiting ourselves to the specific form of cabinet herein described in detail.

The various features of our invention and their advantages will readily become apparent from a perusal of the following specification and claims.

In the accompanying drawings forming part of this specification,

Figure 1, is a front elevation of our invention, partly broken away to illustrate construction,

Fig. 2, is a sectional view on line 2—2 of Fig. 1,

Fig. 3, is a similar view as that shown in Fig. 2, except it is broken away at top and the operating parts are in a different position,

Fig. 4, is a sectional view on line 4—4 of Fig. 2,

Fig. 5, is a side elevation of the invention, and

Fig. 6, is a sectional view same as Fig. 2, except that the operating mechanism is in a different position.

In carrying out our invention we provide a cabinet or box, formed of a top 1, bottom 2, side walls 3 and 4 and a back 5. The front part of the cabinet is open and we provide a partition 6 which divides the cabinet into an upper chamber 7 and a lower chamber 8; in the chamber 7 we provide a series of partitions 9 so that spaces 10 are formed between them into which the records 12 are placed and in which they rest, these partitions and spaces are of a height and

width to allow of a snug fit for the records; the lower chamber containing the operating mechanism. These partitions 9 form spaced compartments or filing divisions between them.

In chamber 7, we extend a shaft 13, said shaft passing through the partitions 9 and spaces 10 and into the side walls 3 and 4, in which said shaft is supported and journaled.

On the shaft 13, in each of the spaces 10, we mount and fulcrum a vertical arm 14; this arm may be of any suitable shape or construction. At the lower end of arm 14, at the point 15, we pivot the rear end of a horizontal bar or long arm 16, provided with an upwardly extending finger 17, passing through a slot 18 in the partition 6; the arm 14 also extending through a slot 19 in partition 6.

This long arm 16 is provided with a recess 20 as shown and is also provided with a stop lug 21, for limiting the movement of arm 16. On the bottom surface of partition 6, we securely fasten a stop finger 22 which fits into the recess 20 when the finger 17 is in its highest position and the long arm 16 is held in this normal position by means of the spring 23. On the long arm 16 we provide a downwardly projecting post 40 and to the bottom 2, we fasten an upwardly extending post 41 and between these two posts we extend and connect a coiled spring 42. The mechanism just described is provided for each space 10 and for each record, shown particularly in Figs. 1 and 4.

In the lower chamber 8 we provide a shaft or bar 24 which is fastened in the sides 3 and 4 and on this shaft is placed a lever 40 having a forked arm 25 and a handle 26; this lever can be slid to and fro on the shaft 24. The forked end 25 engages the forward end of the long arm 16, straddling the same as shown.

At the front of the bottom chamber 8, we fasten the upper rail 27 and the lower rail 28, extending across the device, and forming the elongated slot or space 29 between them. In the upper rail 27 we place vertical recesses 30, into which the handle 26 can enter when up.

In connection with each of the long arms 16, we employ the following described device, for holding the said arm and its connections in inoperative position until it is desired to use said arm and connections, to place a record in said space.

In the lower chamber 8, we place at each side a bearing 31, in which we support shaft 32 extending across the device. On each arm 16 we connect a pin 33 and to co-act with said pin we provide a short lever 34 which pivots on the shaft 32, having a notch 35 at its top edge, which engages said pin 33. When the short lever 34 is up and in

a vertical position as shown in Fig. 6, and is in engagement with pin 33, the operating means are all locked against any operation. In order to place the same in operative position, we provide a door 36 hinged at 37, which door extends across the device, which can be unlocked so that the operator can reach the short lever 34 and drop it as shown in Figs. 2 and 3, this allows the parts to be operable.

The spring 42 is always in tension. When the long arm 16 is disconnected from the stop finger 22, as the upper member of the forked part 25 engages said long arm, by reason of the operator lifting up handle 26, see Fig. 3, this tension on spring 42 is partially relaxed and the arm 14 is forced forward at its upper part, engaging the record and throwing it forward, see Fig. 3. During this operation the upper edge of the bar 16 is riding on the lower edge of the finger 22 and is held in this position by the spring 23 and stop 21; at this time the handle 26 is up in the slot 30 and can not be moved to the right or left and is thus locked in this position, at the same time the lower member of fork part 25 is holding the handle up in its position in said slot so that it can not be moved laterally.

When the device is empty and it is desired to load the same, the short lever 34 is dropped, to place the mechanism in operative position, the handle 26 is then slid to the space 10 into which it is desired to insert the record, and then lifted, this forces the upper member of fork 25 to engage the upper end of long arm 16, rocking or tilting said arm, this pulls down the finger 17 so that the record can be started into the space 10 and this operation also forces back the arm 14 by reason of the record pressing against it at the top, said arm 14 thus being pressed back at the top operates upon arm 16 and this operation forces the stop finger 22 to enter recess 20 in arm 16, and the spring 23 pulls up the said arm 16, consequently raising finger 17; this operation also drops the handle 26 and disengages it from the slot 30, and then the record is locked in place, and can not be removed until operated upon as above set forth by the mechanism for ejecting it.

The finger 17 prevents any record from being inserted in any of the compartments, except into the one only from which a record has been extracted, as in this particular compartment the finger is down.

From the above description it will be seen that our improved record filing mechanism, constructed according to our invention, is of an inexpensive and extremely simple nature and is especially well adapted for the purpose for which it is designed, and it will also be obvious from the above description that the same is capable of considerable

modification without material departure from the principle and spirit of the invention, and for this reason we wish to be understood as not limiting ourselves to the precise form and arrangement of the several parts of the mechanism as herein set forth, in carrying out our invention in practice, and we wish to be understood that such modifications will still fall within the scope of our invention.

What we claim as new and our invention and desire to secure by Letters Patent is:

1. In record filing mechanism, a cabinet for separately holding the records to be filed, means, operated by the record, for locking said record in place.

2. In a record filing mechanism, a cabinet having immovable compartments for separately holding the records to be filed, means for withdrawing a record, means operated by the withdrawal of the record itself for preventing the insertion or withdrawal of another record in the cabinet, until a record has been inserted in the immovable compartment from which the record was withdrawn.

3. In record filing mechanism, a series of compartments for holding records separately, means for ejecting said records singly, said means operated by the record for locking said record in place, and separate mechanism capable of lateral movement for

engaging each compartment mechanism separately.

4. In a record filing mechanism, a cabinet provided with immovable compartments for separately holding the records to be filed, mechanism for ejecting only one record at a time, and separate means for independently locking the ejecting mechanism, rendering it inoperative.

5. In a record filing mechanism, a cabinet having compartments for singly holding the records to be filed, means for singly ejecting the records from said compartments, means for singly locking the same in said compartments, and separate and independent means for locking the empty compartments not in use, rendering such unused compartments inoperative for receiving records.

6. In a record filing mechanism, a cabinet for separately holding the records to be filed, means, operated by the record, for locking said record in place, and separate independent means for rendering the unused compartments inoperative against the insertion of a record.

WILLIAM STUEBING, JR.
LOUIS J. VAN GUELPEN.

Witnesses:

L. M. DUNLAP,
W. C. STUEBING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SPRING CONTROLLED NOISELESS MOTOR FOR OPERATING
TALKING AND OTHER MACHINES.

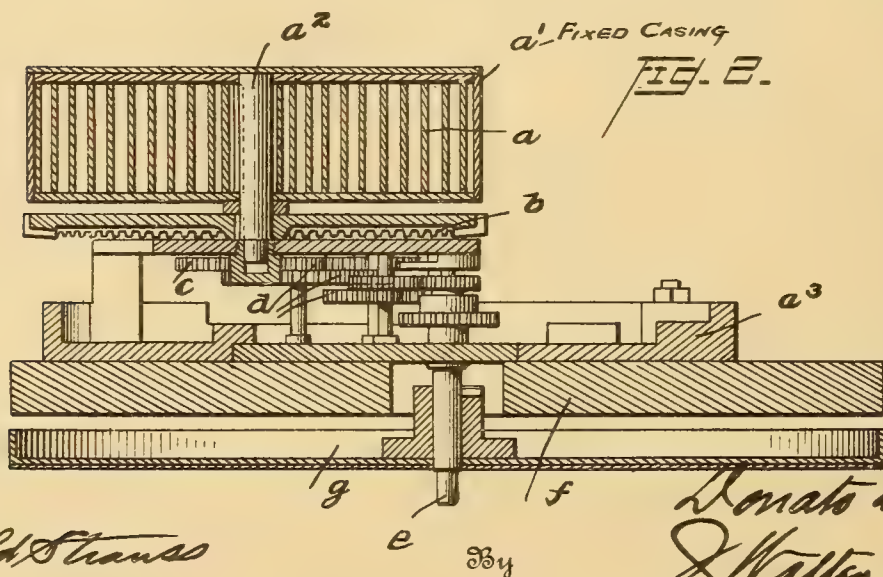
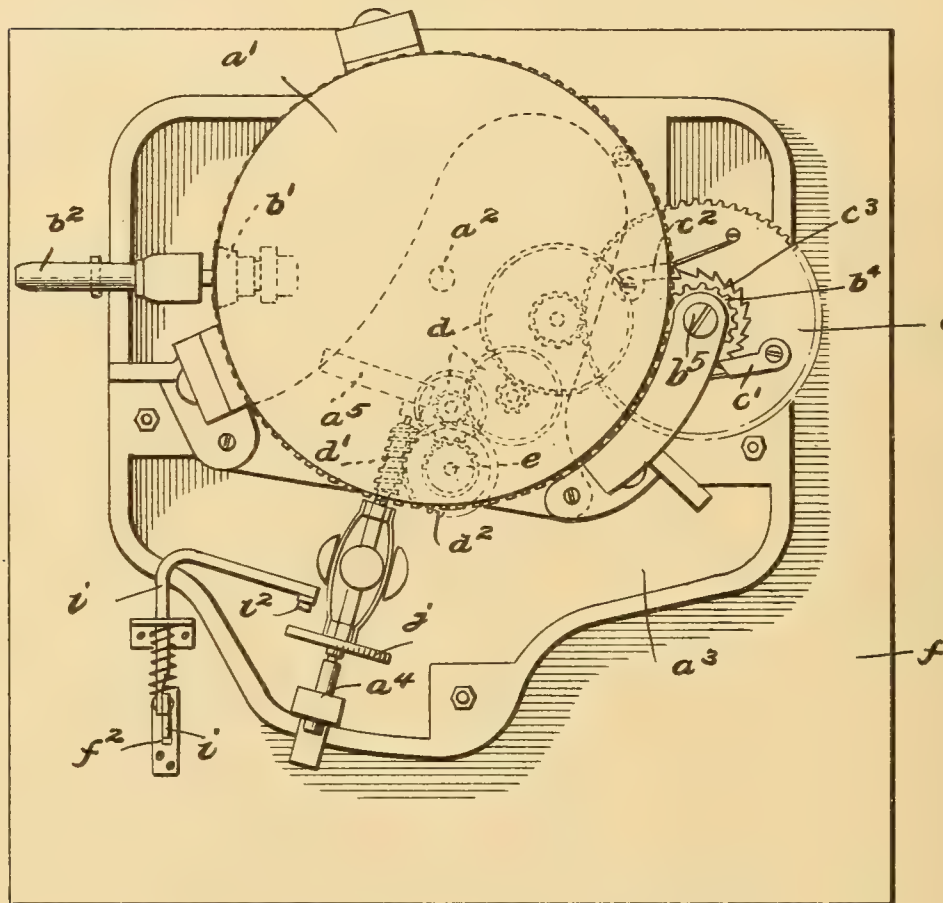
1,258,753 ----- D. DiCarlo,
Patented Mar. 12, 1918,
Filed June 26, 1917.

D. DI CARLO.
 SPRING CONTROLLED NOISELESS MOTOR FOR OPERATING TALKING AND OTHER MACHINES.
 APPLICATION FILED JUNE 26, 1917.

1,258,753.

Patented Mar. 12, 1918.
 2 SHEETS—SHEET 1.

FIG. 1.



Witness
Harold Strauss

Inventor
Donato Di Carlo
J. Walter Douglas
 Attorney

D. DI CARLO.

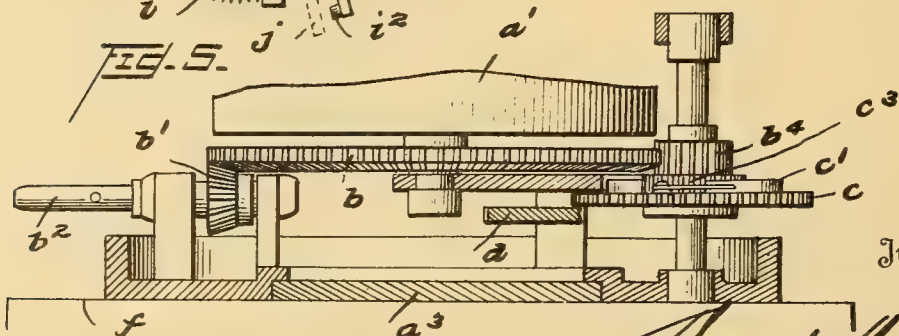
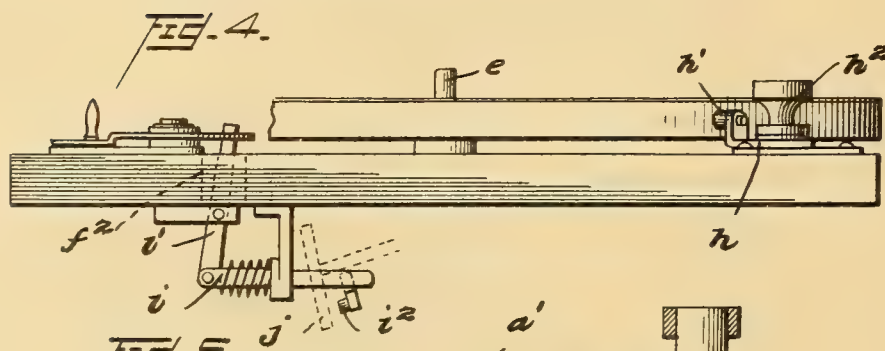
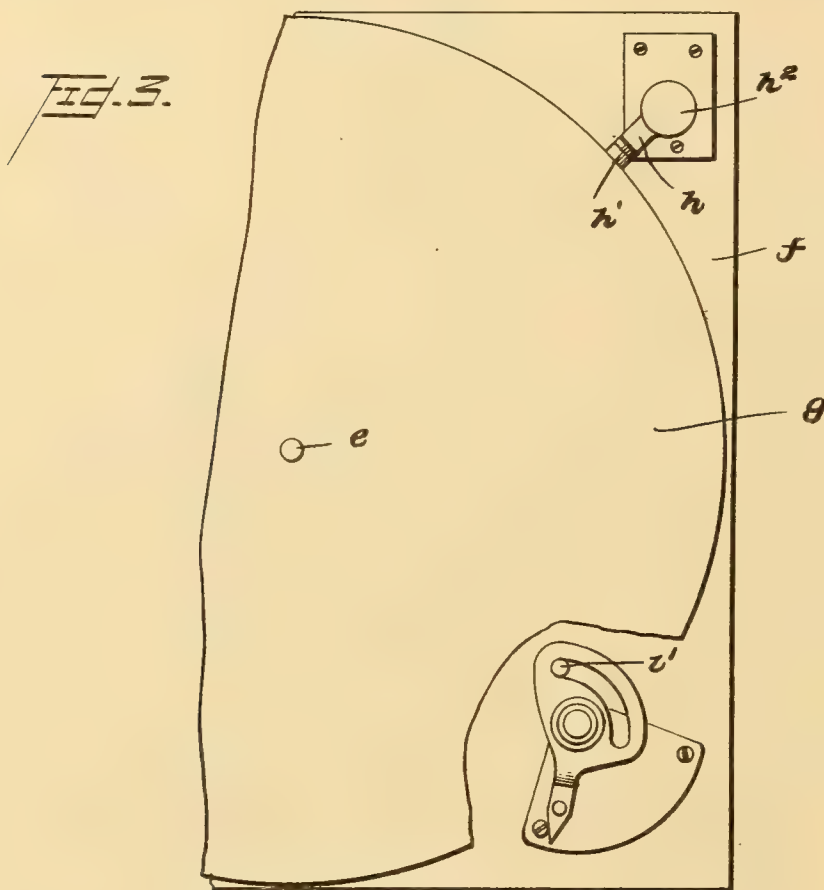
SPRING CONTROLLED NOISELESS MOTOR FOR OPERATING TALKING AND OTHER MACHINES.

APPLICATION FILED JUNE 26, 1917.

1,258,753.

Patented Mar. 12, 1918.

2 SHEETS—SHEET 2.



Witness

Harold Strauss

By

Domenico Di Carlo,
J. Walter Douglas,
Attorney

UNITED STATES PATENT OFFICE.

DONATO DI CARLO, OF PHILADELPHIA, PENNSYLVANIA.

SPRING-CONTROLLED NOISELESS MOTOR FOR OPERATING TALKING AND OTHER MACHINES.

1,258,753.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed June 26, 1917. Serial No. 176,950.

To all whom it may concern:

Be it known that I, DONATO DI CARLO, a subject of the King of Italy, (but who has declared his intention of becoming a citizen of the United States,) and now residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Spring-Controlled Noiseless Motors for Operating Talking and other Machines, of which the following is a specification.

My invention relates to a type of motor for the defined purposes, in which the energy or power is stored by the means of a coiled spring; and in such connection my present invention relates to certain particular features in the constructive arrangement of the motor, embracing a flat coil spring mounted in a stationary casing and horizontally positioned, one end being secured to a rotatable arbor keyed to a gear and which latter meshes with a pinion and is operated by a manually actuated horizontally arranged hand crank shaft, arranged to one side of the motor; the opposite end of the flat coil spring being secured to the stationary casing and with a vertical main driven shaft which is controlled in its movement by means of a train of gears, constituting actuating mechanism of the motor and with a centrifugal governor in positive connection with said mechanism. The assembled arrangement of the defined motor actuating mechanism is such as to be adapted for revolving a turntable located above a platform and the latter is provided with a shiftable stop device and with a speed changer, which is adapted to be brought periodically into the path of the said governor, whereby is provided a practically noiseless motor for use especially for operating in a talking or other similar machine.

The particular features of novelty of the motor of my present application over Letters Patent granted to me under date of July 25th, 1911, No. 998,757 resides first, in the noiseless character thereof; second, in the horizontal arrangement of the motor with its operating mechanism and in the simplifying of the same as designed, for especially adapting such motor for the operation of a talking or similar machine; and third, to the inclosing of the coiled leaf spring in a stationary casing for winding and unwinding and with the actuated gear and pinion mech-

anism located outside of the said casing and above the same in horizontal position in respect thereto and the main driven shaft arranged vertically for operating the turntable of the talking or other similar machine.

My invention stated in general terms, consists of a spring controlled noiseless motor for actuating a talking or other similar machine constructively arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my present invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which—

Figure 1, is an inverted top or plan view of a motor and actuated mechanism mounted in a framing, embodying essential features of my invention and showing also the platform with the revoluble turntable and speed change device.

Fig. 2, is an inverted vertical sectional view through the motor and actuated mechanism of the same.

Fig. 3, is a fragmentary plan view of the stopping and speed change devices of the motor.

Fig. 4, is an end view, showing the structural arrangement of the speed change and stopping devices, and

Fig. 5, is a fragmentary sectional view partly in elevation of the motor and its actuating mechanism.

Referring to the drawings *a*, is the incased flat coil spring, one end bolted to the casing *a*¹, and the other to a rotatable arbor *a*², journaled in said casing and extending through the opposite end of the said casing and to which is keyed or otherwise secured a horizontally positioned gear *b*, operating a pinion *b*¹, connected with a horizontal hand operated shaft *b*², by means of a detachable crank-handle, not shown. On a vertical shaft *b*³ is mounted a gear *b*⁴, meshing with the large gear wheel *b*. A gear *c* is arranged beneath the gear *b*⁴, the connection between the gears *b*⁴ and *c* being the usual ratchet wheel *c*³ and spring-controlled pawls *c*¹, *c*², permitting winding operation of the spring without driving gear *c*. *d*, is a train of connected gears and pinions successively actuated by the gear *c*, and therewith the vertical main driven ball bearing shaft *e*, projecting above the top of the

skeleton framing a^3 , and with a removable platform f , arranged to receive a turntable g , mounted thereon and fitting the driven shaft e , for permitting of the rotating of the same. At one corner of the platform f , is arranged a lever h , carrying a buffer h^1 , at the free end and a milled lock-bolt h^2 , for operatively controlling the said lever. The said lever is adapted to be shifted in substantially the arc of a circle, to engage the perimeter of the revoluble turntable to stop or slow down its travel. The opposite corner of the platform f , is provided with a slanting or inclining lever rod i , with a handle i^1 , at one end and buffer i^2 , at the opposite end. This handle extends downward through a slot f^2 , in the said platform and is adapted by shifting the handle either back or forth to bring the buffer into either close proximity to or shift it some distance from the centrifugal governor j , to be thereby momentarily engaged. The governor j , is journaled in a bearing a^4 , of the skeleton framing a^3 . It also is provided with a worm d^1 , meshing with one of the pinions as d^2 , of the train of gear and pinion mechanism d , of the hereinbefore described motor, and actuated thereby, when the flat-coil spring a , is wound up as already explained, in any well understood manner. The device just explained is adapted to permit of the quick

change in the speed of travel of the turntable g , as may be required, in operations of the talking machine for deriving the desired musical or other effects therefrom.

Having thus described the nature and objects of my invention what I claim as new and desire to secure by Letters Patent is:—

A spring controlled motor for phonographs or the like, comprising a fixed casing, a flat spring coiled in said casing, an arbor rotatably mounted in the casing and having one end of the spring secured thereto, a winding gear fixed to the arbor and having beveled teeth, a winding means co-operating with the beveled teeth of the winding gear for the winding operation, said winding gear being also formed with driving teeth, a driven gear operated from the driving teeth of the winding gear, a turntable-carrying shaft, and a train of gearing between the driven gear and the shaft, said gear train being located above and within the plane of the casing.

In witness whereof, I have hereunto set my signature in the presence of two subscribing witnesses.

DONATO DI CARLO.

Witnesses:

J. WALTER DOUGLASS,
 MARIAN GROOM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

LID SUPPORT

1,259,075 -----C.A.Bratt & C.M.Holcomb,
Filed Aug. 29, 1917,
Patented Mar. 12, 1918.

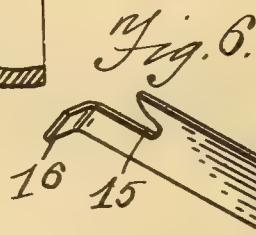
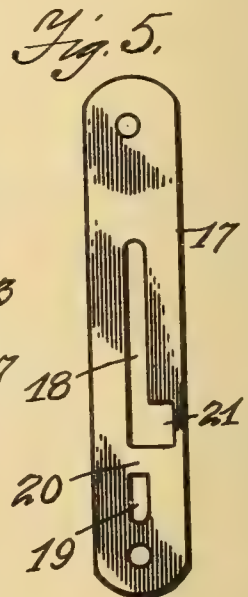
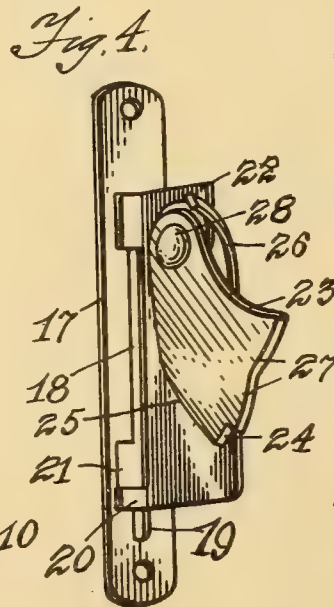
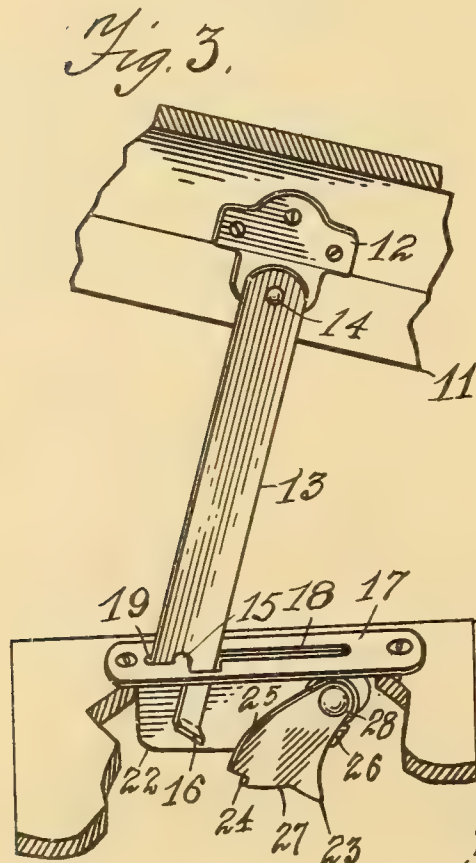
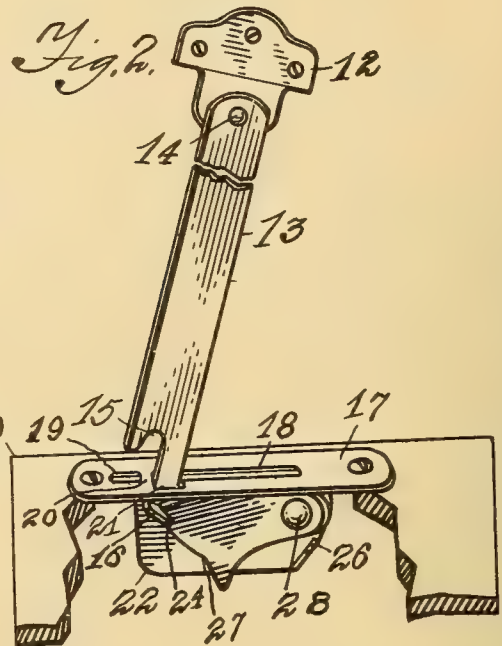
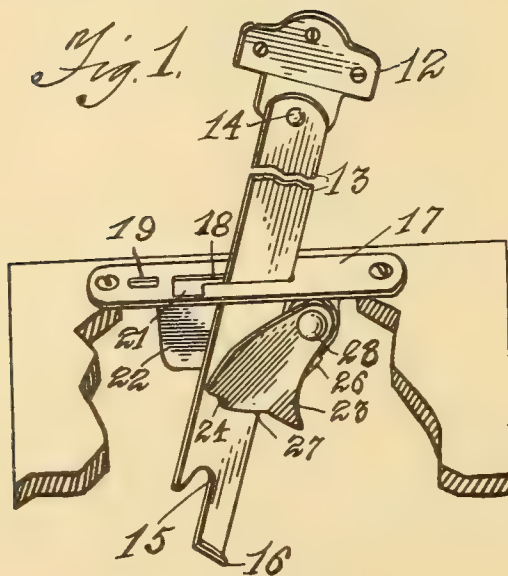
C. A. BRATT & C. M. HOLCOMB.

LID SUPPORT.

APPLICATION FILED AUG. 29, 1917.

1,259,075.

Patented Mar. 12, 1918.



Witness

J. E. Nordstrom
H. A. Sandberg

Inventor

Clayton A. Bratt
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By

J. Arthur Baldwin
Attorney

UNITED STATES PATENT OFFICE.

CLAYTON A. BRATT AND CHARLES M. HOLCOMB, OF JAMESTOWN, NEW YORK,
ASSIGNORS TO WEBER-KNAPP COMPANY, OF JAMESTOWN, NEW YORK, A COR-
PORATION.

LID-SUPPORT.

1,259,075.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed August 29, 1917. Serial No. 188,865.

To all whom it may concern:

Be it known that we, CLAYTON A. BRATT and CHARLES M. HOLCOMB, citizens of the United States, residing at the city of Jamestown, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in a Lid-Support, of which the following, taken in connection with the accompanying drawings, is a specification.

The invention relates to lid supports; and the object of the improvement is to provide a supporting plate having bridged double slots and a swing carrying plate for a swing support bar for the lid, said bar having a notched or divided lower end with two lugs which engage astride the bridging between said double slots, provision being made in one of said double slots for the complete insertion and removal of said support bar; and the invention consists in the novel features and combinations hereinafter set forth and claimed.

In the drawings, Figure 1 is a perspective view of a portion of the top of a receptacle with the slotted plate attached thereon and the swing support bar for the lid and swing carrying plate which carries said swing support bar into engagement with said slotted plate, the parts being shown in the disengaged position when the lid is closed; and Fig. 2 is a similar view of the parts in the position which they will assume when the lid is raised, the notched end of the support bar being carried over in the notched end of the carrying plate to engage the bridging of the slotted plate; and Fig. 3 is a similar view after engagement, the lid being shown in the raised and supported position and the swing carrying plate in the dropped position. Fig. 4 is a plan view of the underside of the slotted plate with the swing carrying plate thereon; and Fig. 5 is a top plan view of the same showing the preferred shape of the slots with the bridging therebetween which is engaged by the lower end of the support bar; and Fig. 6 is a perspective view of said lower end of the support bar showing the shape of the notch and the turned end of the support bar.

Like characters of reference refer to corresponding parts in the several views.

The numeral 10 designates the receptacle and the numeral 11 the lid or cover for the same.

The lid 11 has a bracket plate 12 attached thereto which pivotally supports on a depending lug the swinging support bar 13, the bar 13 being freely pivotal at 14 on said depending lug on the plate 12. The lower end of the support bar 13 has the notch 15 extending into the end and side of the same, the lower end 16 being turned sidewise to form a stop which engages on the underside of a slotted plate 17 attached to the top of the receptacle 10 to limit the upward movement of the lid 11, the notch 15 having the guide walls on its opposite sides for engagement with the plate 17.

The plate 17 is provided with the closed slots 18 and 19 which are preferably in alignment and have the bridging or cross bar 20 therebetween over which the notched end 15 of the support bar 13 engages when in the cover supporting position, as shown in Fig. 3. The slot 19 also has the sidewise opening 21 which permits the angular end 16 passing therethrough thereby permitting the removal or insertion of the support bar 13 to and from the plate 17.

The plate 17 is provided with a downwardly projecting portion 22 which may be a part thereof or attached thereto by spot welding or any similar process that will firmly attach the same. A swing carrying plate 23 is pivotally attached at 28 to the downwardly projecting portion 22 of the plate 17 near one side of the same, the length of the swing carrying plate 23 being apportioned to carry the swing support bar 13 into position against the bridge 20 so that said bar is forced into positive engagement with said bridge when the lid is raised, after which the swing carrying plate 23 drops out of engagement with the support bar 12, having no other office than this carrying action. In order to insure the positive action of the swing carrying plate 23 in its engagement with the angular end 16 of the swing support bar 13, a notch 24 is provided in the swing carrying plate 23 into which the angular end 16 fits, as shown in Fig. 2, which notch 24 holds the end 16 of the bar 13 from slipping downward on the swing plate 23 as it carries the support bar 13 forward into contact with the bridging portion 20 of the plate 17. The upper side 25 of the plate 23 is curved slightly in order to form a stop against the underside of the slotted plate 17 so that the support bar 13 is stopped at the

correct position so as to insure the positive engagement of the notch 15 over the bridging 20 when the lid 11 is released and lowered slightly into the supported position, as shown in Fig. 3. As soon as the downward movement of the lid 11 begins the plate 23 automatically drops out of engagement with the turned end 16 of the bar 13, dropping against the turned stop or lug 26 on the plate 22 and is ready for reengagement with the swing support bar 13 when it is desired to repeat the raising of the lid to the supported position.

To release the swing support bar 13 the lid 11 is merely raised thereby permitting said support bar 13 to swing toward the rear end of the slot 18 alongside the plate 22 and between said plate 22 and the swing carrying plate 23 thereby passing down into the position shown in Fig. 1 with the parts automatically in position ready for reengagement to carry the support bar 13 into the supporting position for the lid 11. The lower edge 27 of the swing plate 23 is notched and curved slightly so as to guide the angular end 16 into the notch 24 as the swing plate 23 is raised by the upward draw of the lid 11.

It is apparent that this arrangement of the parts causes the action to become substantially automatic. The different parts, and particularly the swing plate 23, may be made of fiber board or other non-resonating materials provided they are of sufficient strength to perform the office required.

We claim as new:—

1. A lid support comprising a member swingingly secured to the lid and having a forked lower end, a member having a slot to receive said swinging member slidably therethrough, and a second swing member on said slotted member engaging said forked end of said swinging member to guide said forked end into holding engagement with said slotted member.

2. A lid support comprising a swing bar pivotally attached to the lid and having a notched lower end, a support plate having two slots substantially in alinement to slidably receive said swing bar in one of said slots, and a swing carrying plate having a notch therein to engage said swing bar and carry its notched end into engagement with the bridging between said slots when the lid is raised.

3. A lid support comprising a bracket plate having a depending lug, a lid support bar pivotally swung from said lug, a plate having two slots substantially in alinement with crosswise bridging therebetween, an angular lower end on said support bar, said end having a notch therein to engage over said crosswise bridging when said bar is slidably raised in one of said slots, and a swing carrying plate pivotally mounted on

said slotted plate to carry said angular lower end over against said bridging when the lid and said support bar are raised.

4. A lid support comprising a bar dependingly attached to the underside of the lid and having a forked lower end, one of the legs of said fork turned at an angle to form a stop, a support plate having two slots connected by bridging, one of said slots having a sidewise opening to receive the angular end of one of said forked legs, a downwardly projecting portion on the underside of said slot plate, and a swing carrying plate pivotally attached to said downwardly projecting portion to engage said angular forked leg and carry said leg against said bridging when the lid is raised to engage said forked end over said bridging.

5. In a support for hinged lids, swingable means, means to connect said means to the lid, means to guidingly engage the swingable means, means to hold the swingable means against movement with the lid in open position, and means engageable with the swingable means to shift the latter forwardly and into engagement with the holding means.

6. In a lid support, swingable means for connection with the lid having a part to hold same against downward movement, means formed to guidingly receive said swingable means and to engage said part, and gravity responsive means arranged to guide the swingable means of the lid into engagement with the second named means and to then return to normal position so as to allow the swingable means upon closing of the lid to move past the gravity means without interference from the latter.

7. A lid support, comprising a swingable member for connection to the lid having a part to hold same against downward movement, means formed to guidingly receive said member and to engage said part to hold the member and thereby the lid in open position, a pivoted gravity responsive element arranged to be engaged by said member only upon upward movement of the latter to guide same so that said part of the member will be operatively engaged with said means so as to hold the member in upward position, said element being disposed so that upon disengagement thereof from said member same will drop to a position so as to allow the member to move downwardly without interfering with the member, and means whereby to limit upward movement of the element so as to cause the latter to stop upon the member reaching a position where its said part engages the second named means.

8. In a support for hinged lids, swingable means, means to connect said means to the lid, means to guidingly engage the swing-

able means, means to hold the swingable means against movement with the lid in open position, shifting means for the swingable means engageable with the swingable
5 means to shift the latter forwardly into engagement with the holding means, and means to mount the shifting means whereby same after shifting of the swingable means will be restored to normal position
10 so as to allow the swingable means to return to lid-closed position without interference from the shifting means.

9. In a lid support, swingable means formed for connection with the lid, means

guiding said first means during opening and closing of the lid, means for shifting the first means from its normal path on opening of the lid, and means arranged in front of the shifting means for engaging said first means when out of its normal path for
15 holding the lid open. 20

In testimony whereof we have affixed our signatures in the presence of two witnesses.

CLAYTON A. BRATT.

CHARLES M. HOLCOMB.

Witnesses:

H. A. SANDBERG,

I. E. NORDSTROM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

STOP FOR TALKING MACHINES.

1,259,110 ----- J. S. Lane,
Filed June 22, 1917,
Patented Mar. 12, 1918.

J. S. LANE.
STOP FOR TALKING MACHINES.
APPLICATION FILED JUNE 22, 1917.

Patented Mar. 12, 1918.

1,259,110.

Fig. 1.

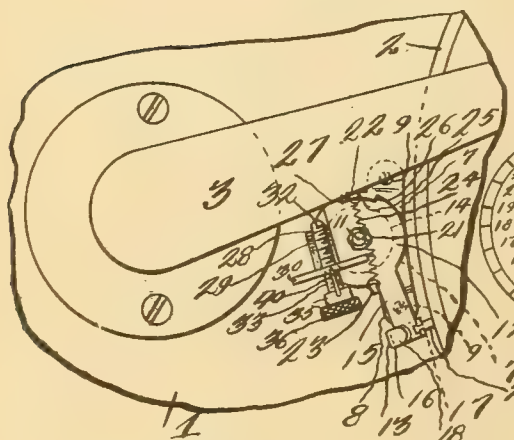
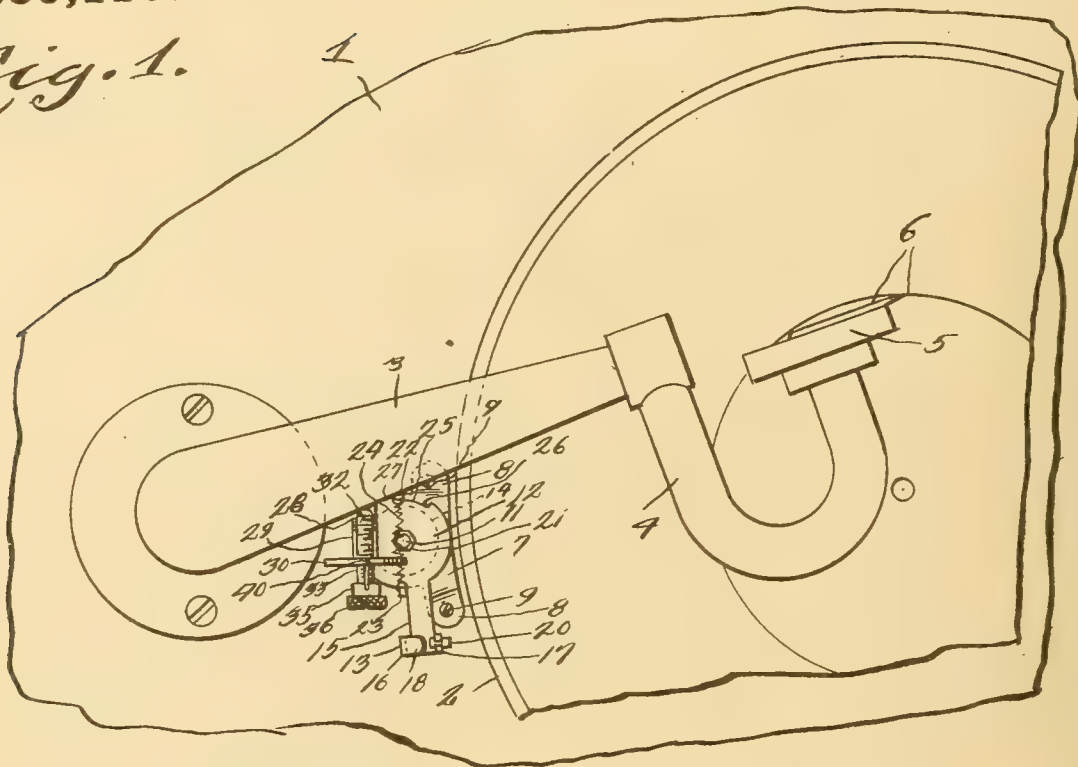


Fig. 2.

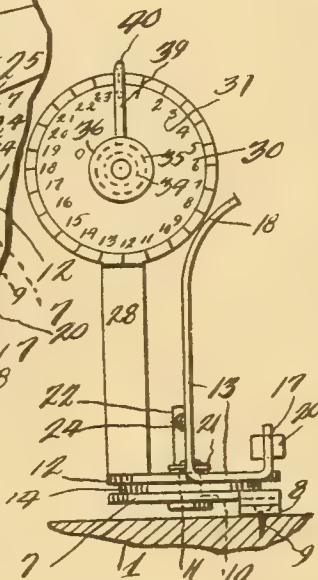


Fig. 3.

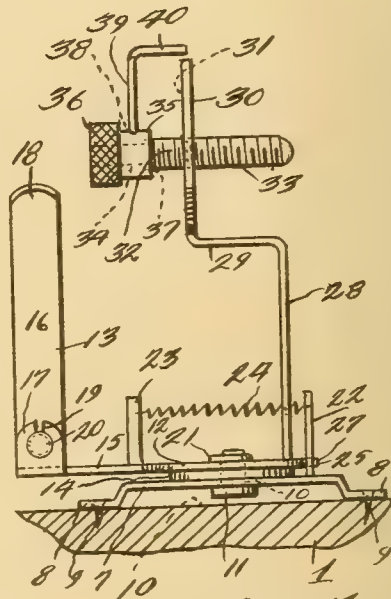


Fig. 4.

Inventor

J. S. Lane

Witnesses
Philip Swell
Francis L. Brownell

By R. Swift & Co
Attorneys

UNITED STATES PATENT OFFICE.

JAMES SIDNEY LANE, OF SNOHOMISH, WASHINGTON.

STOP FOR TALKING-MACHINES.

1,259,110.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed June 22, 1917. Serial No. 176,370.

To all whom it may concern:

Be it known that I, JAMES S. LANE, a citizen of the United States, residing at Snohomish, in the county of Snohomish, State of Washington, have invented a new and useful
5 Stop for Talking-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the art of talking machines, and more especially to an improved stop, to be automatically actuated by
15 the tone or sound arm for stopping the turn table that supports the record.

A further object of the invention is the provision of a device of this kind having an oscillatory spring tension frame or bracket
20 mounted upon a plate and provided with a screw to be adjusted according to graduations upon a dial, whereby, as the stylus or needle reaches the end of the sound groove of the record, the tone or sound arm will en-
25 gage the end of the abutment screw and cause the frame or bracket to oscillate incident to the tension of its spring, thereby applying a buffer to the turn table for stopping the same.

A further object of the invention is the provision of a dial and an abutment screw threaded through its center, and having an arm to overlie and register with any one of the graduations of the dial in accordance
30 with the ending of the sound groove of the record, whereby the tone arm may contact with said screw to oscillate said frame or bracket. This abutment screw may be provided with any number of threads, each of
35 any suitable pitch in accordance with the graduations of the dial and vice versa. In other words, the graduations of the dial may be varied according to the pitch and the number of threads.

In practical fields, the details of construction may necessitate alterations falling within the scope of what is claimed.

The invention comprises further features and combination of parts, as hereinafter set
40 forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a plan view of a portion of a talking machine, showing the improved

stopping device applied, whereby the tone or sound arm may automatically actuate the
55 stopping device.

Fig. 2 is a plan view showing the stopping device as having been actuated.

Fig. 3 is a view in side elevation of the stopping device, showing the same on an en-
60 larged scale.

Fig. 4 is a view in elevation at right angles to that illustrated in Fig. 3.

Referring more especially to the drawings, 1 designates a portion of the casing of
65 a talking machine, and in which casing the motor, not shown, for driving the record supporting turn table 2 is designed to be arranged. Swiveled in a conventional man-
70 ner on the casing 1, whereby it may oscillate across the record is a conventional form of tone or sound arm 3, which is provided with the usual coupled vertically oscillatory section 4 which is supplied with the sound
75 box 5 having the stylus or needle 6. A partial circular supporting plate 7 is provided, the same having laterally extending perforated ears 8. Said ears are bent down-
80 wardly so as to hold said plate spaced at an interval above the casing 1, there being suitable screws 9 passing through the perforations of the ears, to fasten the plate firmly to the casing. The center of the plate 7 has a perforation or aperture 10, for the recep-
85 tion of a pivot bolt 11, the head of which is arranged between the plate 7 and the upper face of the casing. This bolt 11 passes centrally through the circular base 12 of the oscillatory bracket 13, there being a suitable
90 washer or circular plate 14 interposed between the base 12 and the plate 7, thereby holding the base of the bracket spaced from the plate 7. These interengaging parts may be well lubricated, so that the bracket will easily and freely oscillate a limited distance.
95 Projecting from the marginal edge of the circular base of the bracket is a projection 15, the end of which is provided with oppositely disposed upwardly extending long and short arms 16 and 17. The long arm
100 16 has at its upper end an overhanging curved hook 18, to be engaged by an operator's finger for resetting the oscillatory frame or bracket. The short arm 16 is provided with a substantially key-hole shaped
105 slot 19, in the larger end of which a suit-

able buffer 20, constructed of any suitable fiber, either leather or rubber, adapted to engage the marginal edge of the turn table 2, to stop the same, as the stylus or needle 6 reaches the end of the sound groove of the record. A nut 21 is threaded on the upper end of the bolt 11, to hold the circular base of the bracket or frame on the bolt. Rising upwardly from the plate 7 is a lug 22, and rising upwardly from the edge of the projection 15 of the base of the bracket is a lug 23. Connecting the upper ends of the lugs 22 and 23 is a tension spring 24, which, when the bracket or frame is disposed as in Fig. 1 with the buffer out of contact with the turn table, contacts slightly to one side of the center of the bolt 11, so as to hold the buffer out of contact with the table. However, when the frame or bracket is tilted to the position shown in Fig. 2, the spring 24 contracts slightly on the opposite side of the center of the bolt 11, thereby holding the buffer frictionally in contact with the turn table and acting to stop the same. The circular base 12 of the frame or bracket, adjacent its marginal edge, is provided with a cut-away portion 25 having shoulders 26 and 27 at the ends of the cut-away portion. The lug 22 is disposed so as to play between the shoulders 26 and 27 of said cutaway portion. Therefore, the shoulder 27 contacts with the lug 22 when the bracket or frame is in the position shown in Fig. 1, thereby holding said bracket in such position. When the bracket or frame is tilted, it moves so that the shoulder 26 approaches to lug 22 and will contact with said lug, provided the record supporting table be removed, when the spring 24 has contracted on the side of the bolt 11 nearest the table supporting spindle. However, as long as the table 22 remains in place, the shoulder 26 remains out of contact with the lug 22. Extending upwardly from the circular base of the bracket or frame, is an upstanding arm 28 having a right angle extending portion 29, which is provided with an upright disposed disk 30 having a dial 31 on one face. An abutment screw 32 has its shank 33 (which may be provided with any suitable number and pitch of threads) threaded through the center of the disk 30. The screw shank is provided with a reduced part 34 on which a collar 35 is mounted. A knurled head 36 is threaded on the reduced part 34, to hold the collar 35 closely in contact with the shoulder 37 at the point where the reduced part 34 axially extends from the screw. The collar 35 in its wall has an opening 38, in which the angular arm or member 39 is secured in any suitable manner. The lateral portion 40 of the arm 39 overlies and is disposed adjacent the marginal edge of the disk 30, so as to cooperate with the graduations of the dial. In the

operation of the device, it is first found at what graduations the sound grooves of various records end, or terminate. The predetermined graduations, according to the various records, having been ascertained, the record is placed upon the turn table and the screw 32 adjusted, so that the lateral portion 40 of the arm 39 may be arranged accordingly. The tone arm is then placed so that the stylus or needle may follow the sound groove, and when the needle reaches the end of the groove according to the predetermined graduation, the tone arm simultaneously contacts with the abutment screw, which causes the bracket or flange to tilt, causing the buffer to frictionally contact with the marginal edge of the turn table, thereby instantly stopping the same.

The invention having been set forth, what is claimed as new and useful is:—

1. In a stopping device for talking machines, an oscillatory spring tensioned bracket having a brake buffer designed to frictionally contact with the marginal edge of the turn table, said bracket having a dial thereon, and an adjustable abutment screw threaded through the center of the dial and in a plane of the swing of the tone arm to be engaged thereby, said abutment screw having an arm to be set according to a predetermined graduation of the dial, whereby as the stylus reaches the end of the sound groove, said tone arm will engage the screw and oscillate the frame.

2. In a stopping device for talking machines, a supporting plate, an oscillatory bracket pivotally mounted on said plate, the base of the bracket and the plate, each having an upstanding lug, said lugs being diametrically oppositely disposed, said bracket having a brake buffer adapted to engage the marginal edge of the turn table, a spring connecting said lugs to tension on one side of the pivot of the bracket to hold the buffer out of contact with the turn table, and means carried by the bracket to be engaged with the tone arm, as the stylus reaches the end of the sound groove, thereby tilting the bracket and causing the spring to tension on the other side of the pivot to apply the brake buffer to the marginal edge of the turn table.

3. In a stopping device for a talking machine, a support on the casing of said machine, an oscillatory bracket pivotally mounted on the support, the base of the bracket and the support, each having an upturned lug, said lugs being diametrically disposed, said bracket having a brake buffer, a spring connecting said lugs to tension on one side of the pivot of the bracket, whereby the buffer is held out of contact with the turn table, a dial on said bracket, and means threaded through the dial and adapted to be set to a pre-determined graduation of the

dial, whereby, as the stylus reaches the terminus of the sound groove, the tone arm will contact with said means and cause the spring to contract on the other side of the
5 pivot, whereby the buffer will frictionally contact with the turn table.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

JAMES SIDNEY LANE.

Witnesses:

F. W. SITTON,

J. W. HERRON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

The first part of the paper is devoted to a discussion of the
theoretical aspects of the problem. It is shown that the
problem is equivalent to the problem of finding the
minimum of a certain functional. This functional is
defined as follows: $J(u) = \int_{\Omega} |\nabla u|^2 dx$. The
problem is then reduced to the problem of finding the
minimum of this functional over a certain class of
functions. It is shown that the minimum is attained
by a unique function, which is the solution of the
problem. The second part of the paper is devoted to
the numerical solution of the problem. It is shown that
the problem can be solved by the method of finite
differences. The results of the numerical solution are
presented in the form of a table.

SPRING MOTOR

1,259,188 ----- J. Wolff,
Patented Mar. 12, 1918,
Filed July 1, 1916.

J. WOLFF.
 SPRING MOTOR.
 APPLICATION FILED JULY 1, 1916.

1,259,188.

Patented Mar. 12, 1918.

Fig. 1

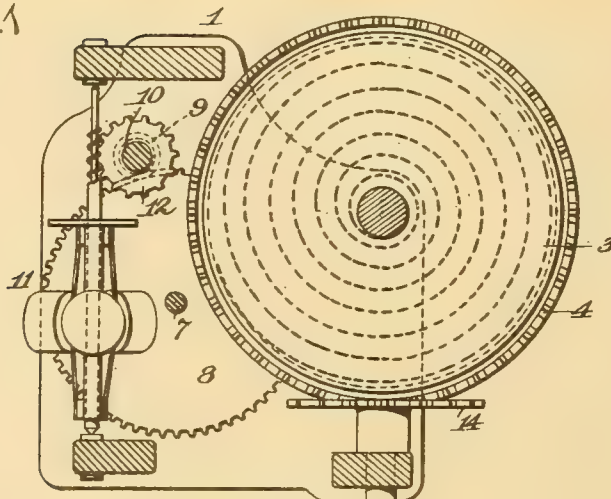


Fig. 3

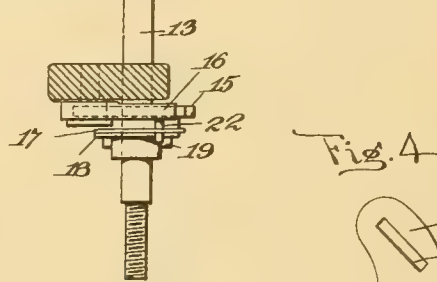
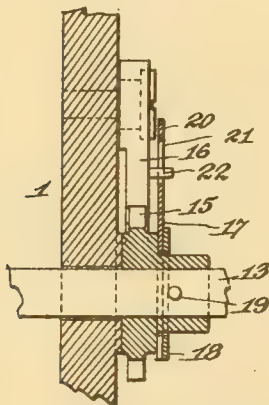


Fig. 4

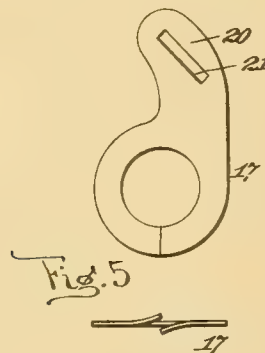
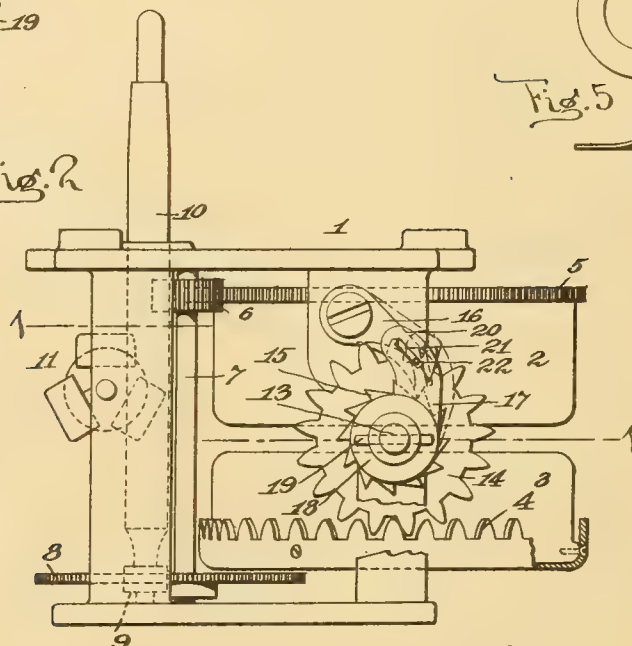


Fig. 5

Fig. 2



Witnesses:

Max Schmitt
Benjamin Schmitt

Inventor

Joseph Wolff
 by *Schechter & Lotz*
 his *Attorneys.*

UNITED STATES PATENT OFFICE.

JOSEPH WOLFF, OF BROOKLYN, NEW YORK, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

SPRING-MOTOR.

1,259,188.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed July 1, 1916. Serial No. 107,141.

To all whom it may concern:

Be it known that I, JOSEPH WOLFF, a subject of the King of Great Britain and Ireland, and a resident of the borough of Brooklyn, in the county of Kings, State of New York, have invented a certain new and useful Improvement in Spring-Motors, of which the following is a specification.

My invention relates to spring motors, and more particularly to motors for talking machines, and has for its object to produce a motor which will be silent in its operation, both when the spring is being wound and when the same is unwinding and driving the motor.

This and further objects will more fully appear in the following specification and accompanying drawings considered together or separately.

I have illustrated my invention in the accompanying drawings, in which,—

Figure 1 is a sectional view taken on the line 1—1 of Fig. 2;

Fig. 2 is a side elevation;

Fig. 3 is a detail section of the pawl and ratchet mechanism;

Fig. 4 is a side elevation of the pawl keeper; and

Fig. 5 is an edge view of the same.

In the drawings, in which like parts are designated by similar reference characters, 1 designates the frame of a motor. Within the frame is mounted a pair of spring barrels 2 and 3 of any approved type. The spring barrel 3 has secured to the lower end thereof a crown gear 4 and the spring barrel 2 is provided with a spur gear 5. Meshing with the spur gear 5 is a pinion 6 on a shaft 7 which also carries a spur gear 8. The gear 8 is in mesh with a pinion 9 on the turn-table shaft 10. A governor 11 is mounted in the frame, and driven by a worm 12 on the shaft 10.

Carried in the frame 1, and at right angles to the shaft of the spring barrels 2 and 3 is a winding shaft 13, by means of which the springs may be manually wound. The inner end of the winding shaft carries a spur wheel 14 which meshes with the crown wheel 4. The gears 4 and 14 are each provided with involute teeth which are spaced apart to a greater degree than is common. By this arrangement one flank only of engaging teeth will be in engagement, and the tendency of the spring to unwind will al-

ways hold the wheels in such engagement whereby the gears will run silently.

Rigidly secured to the winding shaft is a ratchet wheel 15, which is engaged by a pawl 16 mounted on the frame 1 to prevent rotation of the winding shaft by the expansion of the spring. Carried on the winding shaft is a keeper 17 which is held in frictional engagement with the ratchet wheel 15 by means of a washer 18 and cotter pin 19. The keeper is formed of spring metal, and at one side of the perforation through which the winding shaft extends, it is split and the ends turned outward to increase the friction between the ratchet wheel, keeper and washer. The keeper is provided with an extension 20 in which is a slot 21. The slot is engaged by a pin 22 on the pawl 16.

When the winding shaft is turned in the clock-wise direction by means of a crank (not shown), the keeper will, by the frictional engagement with the ratchet wheel, rotate with the shaft. This movement of the keeper will cause the pin 22 to run up in the slot 21, and raise the pawl from the ratchet teeth. When the pin reaches the upper end of the slot, the movement of the keeper will be arrested, and the shaft will rotate relatively to the keeper, and the pawl will be held out of engagement with the ratchet teeth as long as the shaft is moved in the clock-wise direction.

When the winding movement ceases, the spring in the barrel 3 will begin to unwind and rotate the barrel in the anti clock-wise direction. This movement will be communicated to the winding shaft through the gears 4 and 14. As soon as the shaft moves under the influence of the spring, the keeper will move with it, because of the frictional engagement of the keeper with the shaft, the pin will be moved to the bottom of the slot 21, and the pawl will engage a ratchet tooth and arrest the movement of the shaft.

As the pawl is held out of engagement with the ratchet, while the spring is being put under tension, there will be no chatter of the pawl over the ratchet teeth.

It will be seen that the governor 11 is alongside of the spring barrel and that the turn-table shaft 10 and arbor 7 are between the governor and the barrel. By this construction I am enabled to produce an extremely compact motor and one wherein the amount of material employed is very much

less than in motors with which I am familiar.

While I have shown my improved ratchet and pawl mechanism in connection with a talking machine motor, I desire to have it understood that I do not desire to limit myself to such use as the mechanism is capable of general utility.

In accordance with the provisions of the patent statutes, I have described the principle of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative and that the invention can be carried out in other ways.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

A motor having a barrel, a spring within the barrel, a crown wheel having involute

teeth, an involute spur gear meshing with the crown wheel, a shaft carrying the spur gear, a spur gear on the spring barrel, an arbor, a pinion on the arbor and engaging the spur wheel, a gear on the arbor, a turn-table shaft, a pinion on the shaft, meshing with the gear on the arbor, a governor shaft, a worm on the same, a worm wheel on the turn-table shaft for driving the governor shaft, said governor shaft lying parallel to the involute spur gear shaft and alongside the spring barrel, the arbor and turn-table shaft being between the governor shaft and the spring barrel.

This specification signed and witnessed this 14th day of June, 1916.

JOSEPH WOLFF.

Witnesses:

M. E. SCHECHLER,
JOSEPH KEELAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

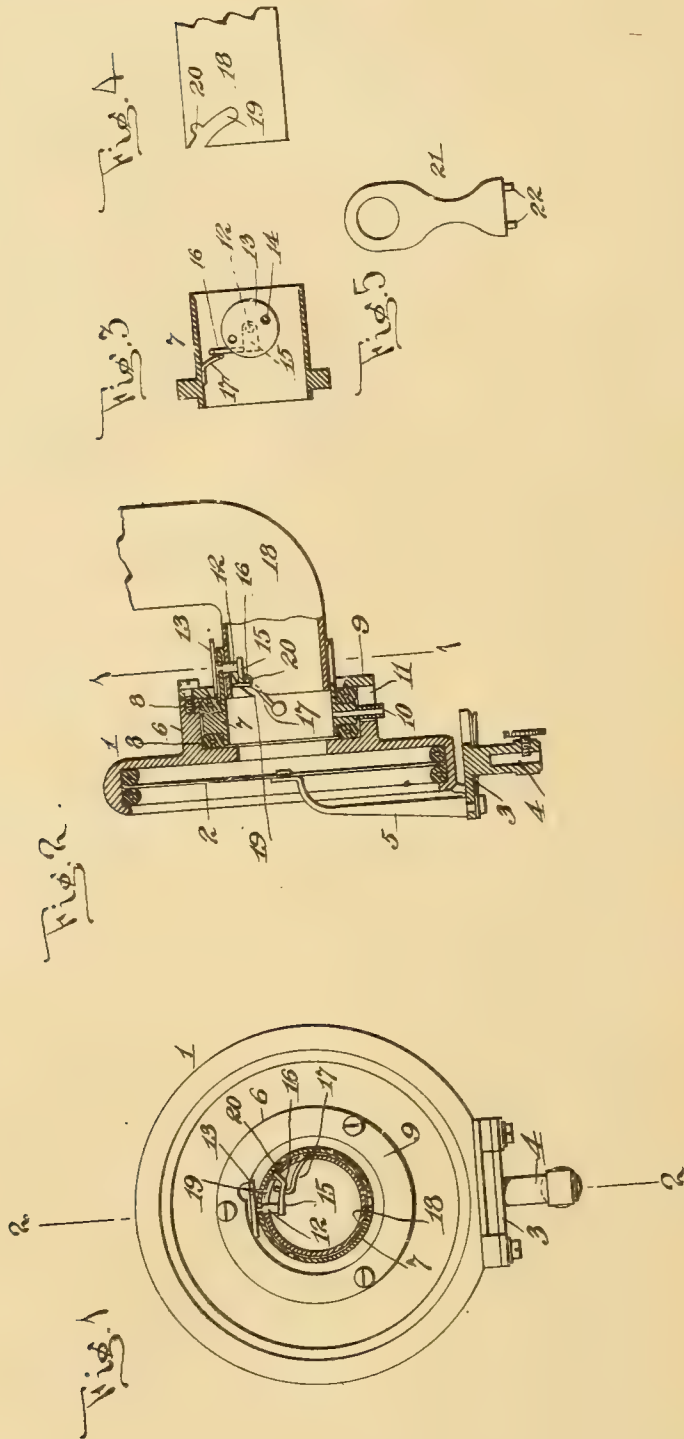
LOCKING DEVICE FOR TALKING MACHINES.

1,259,189 ----- J. Wolff,
Patented Mar. 12, 1918,
Filed Aug. 19, 1916.

J. WOLFF.
 LOCKING DEVICE FOR TALKING MACHINES.
 APPLICATION FILED AUG. 19, 1916.

Patented Mar. 12, 1918.

1,259,189.



Inventor

Joseph Wolff
 by Schechter & Lotz
 his Attorneys.

UNITED STATES PATENT OFFICE.

JOSEPH WOLFF, OF BROOKLYN, NEW YORK, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

LOCKING DEVICE FOR TALKING-MACHINES.

1,259,189.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed August 19, 1916. Serial No. 115,900.

To all whom it may concern:

Be it known that I, JOSEPH WOLFF, a subject of the King of Great Britain and Ireland, and a resident of the borough of Brooklyn, county of Kings, State of New York, have invented a certain new and useful Improvement in Locking Devices for Talking-Machines, of which the following is a specification.

My invention relates to locks, and more particularly to a device for securing the reproducer or speaker of a talking machine to the tone-arm, and has for its objects to produce a device whereby the reproducer will be securely locked to the tone-arm, and cannot be removed by an unauthorized person.

A further object is to produce a device which will be simple and inexpensive to manufacture, and effective in operation.

I have illustrated my invention in the accompanying drawings, in which like reference characters designate corresponding parts in all of the several figures.

In the drawings,—

Figure 1 is a rear elevation of a reproducer partly in section, the section being taken on the line 1—1 of Fig. 2;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a plan view of the lock with the thimble in section;

Fig. 4 is an elevation of the end of the tone-arm; and

Fig. 5 is an elevation of the key.

In the drawings, 1 designates the shell of a reproducer which carries therein a diaphragm 2. To one side of the shell is attached a stylus bar 3 which carries a socket 4, and which is connected to the center of the diaphragm by a bar 5. At the rear of the shell, and communicating therewith is a cylindrical boss 6. A thimble 7 is carried between cushions 8 in the boss and a ring 9 secured to the end of the boss retains the thimble in position. A pin 10 on the thimble projects into a longitudinal slot 11 in the boss, and prevents rotation of the thimble.

Rotatably mounted in the wall of the thimble is a spindle 12 which carries at one end, on the outside of the thimble, a disk 13, which is provided with two diametrically arranged perforations 14, and at the other end, inside the thimble, with a lever 15 which carries a finger 16. The finger projects off to one side of the spindle, and has

its end upturned at an angle so as to engage the bore of the thimble. A spring 17 is anchored in the thimble, and its free end engages the finger 16 and presses it toward the rear of the thimble.

The tone-arm 18 is provided at its outer or smaller end with an inclined slot 19, and one side of the slot has a notch 20 therein, near the open end of the slot.

I provide a key 21 having two projecting pins 22, which are spaced apart so as to engage the perforations 14 in the disk 13. The key is provided with an eye, by means of which it may be carried on a key ring.

The operation of my improved lock is as follows:

The reproducer is placed in position with the thimble in axial alinement with the end of the tone-arm and with the spindle 12 in alinement with the open end of slot 19. The thimble is now placed over the end of the tone-arm and moved forward with a rotary movement until the spindle is seated in the inner end of the slot. As the spindle progresses toward the inner end of the slot, the wall of the slot will engage the upturned end of the finger 16 and move it against the tension of the spring 17 until the finger reaches the notch 20. The speaker is now locked to the tone-arm, and cannot be removed without being unlocked.

To remove the speaker, the pins 22 of the key 21 are inserted in the perforations 14, and the disk 13 is rotated in the counter clockwise direction. The finger 16 will be swung out of the notch 20. The speaker will be rotated in the counter clockwise direction, and the engagement of the spindle 12 with the inclined slot will move the thimble off the end of the tone-arm.

In accordance with the provisions of the patent statute, I have described the principle of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative and that the invention can be carried out in other ways.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. In a talking machine, the combination with a reproducer, a spindle carried by the reproducer, a finger carried by the spindle, of a tone-arm, there being a slot in the tone-

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arm for engagement with the spindle, said tone-arm having a notch for engagement with the finger, and a key for moving the finger.

5 2. In a talking machine, the combination with a reproducer, a spindle carried by the reproducer, a finger carried by the spindle, a spring engaging the finger, of a tone-arm, there being a slot in the tone-arm for en-
10 gagement with the spindle, said tone-arm having a notch for engagement with the finger, and a key for moving the finger.

15 3. In a talking machine, the combination with a reproducer, a spindle carried by the reproducer, a finger carried by the spindle within the reproducer, a perforated disk carried by the spindle outside the repro-
20 ducer, of a tone-arm having an inclined slot in its extremity, there being a notch in a wall of the slot, said slot engaging the spindle, said notch engaging the finger, and a key for engaging the perforations of the

disk, to rotate the spindle and release the finger from the notch.

4. In a talking machine, the combination 25
with a reproducer, a spindle carried by the reproducer, a finger carried by the spindle within the reproducer, a spring engaging the finger, a perforated disk carried by the spindle outside the reproducer, of a tone- 30
arm having an inclined slot in its extremity, there being a notch in a wall of the slot, said slot engaging the spindle, said notch en-
gaging the finger, and a key for engaging the perforation of the disk to rotate the 35
spindle and release the finger from the notch.

This specification signed and witnessed this 17th day of August, 1916.

JOSEPH WOLFF.

Witnesses:

WM. VARIN,
C. WIDDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

ATTACHMENT FOR TALKING MACHINES.

1,259,242 ----- A. Junod,
Filed Apr. 19, 1915,
Patented Mar. 12, 1918.

A. JUNOD.
ATTACHMENT FOR TALKING MACHINES.
APPLICATION FILED APR. 19, 1915.

1,259,242.

Patented Mar. 12, 1918.

3 SHEETS—SHEET 1.

Fig. 1

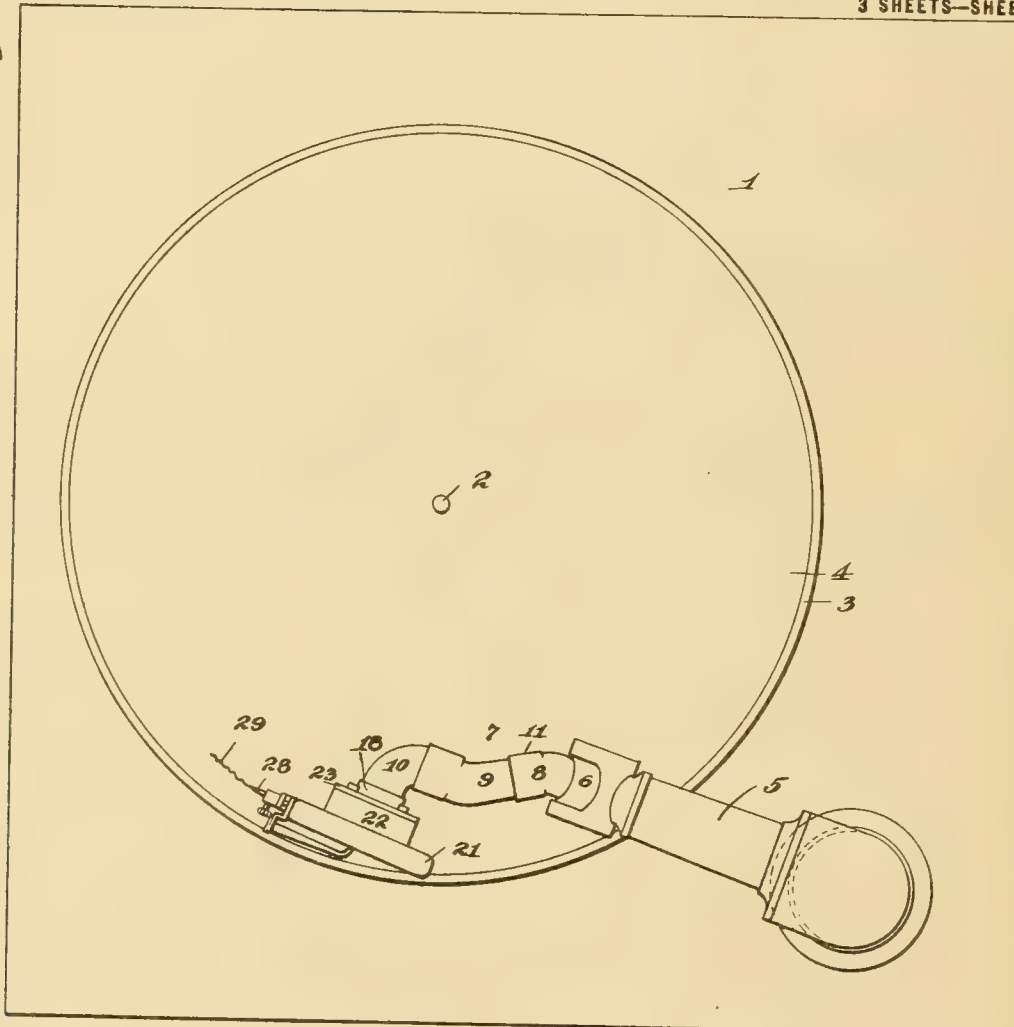
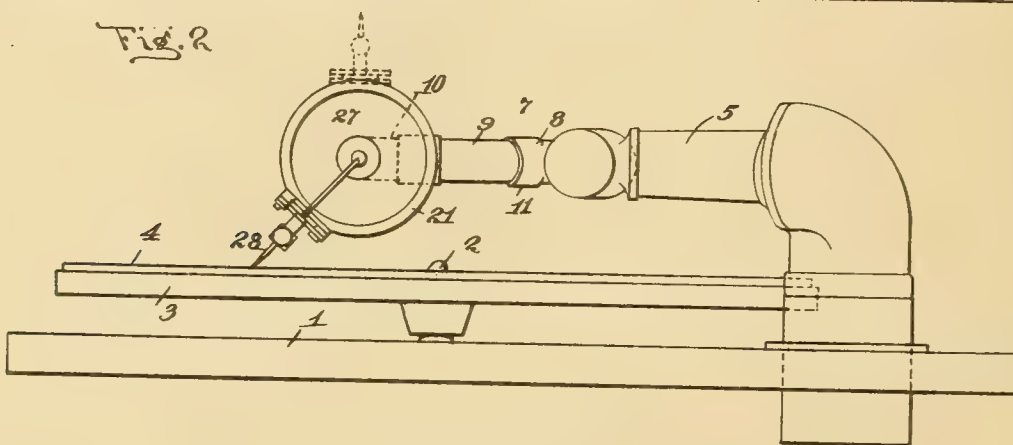


Fig. 2



WITNESSES:

Elijah F. Munn, Jr.
W. Jones.

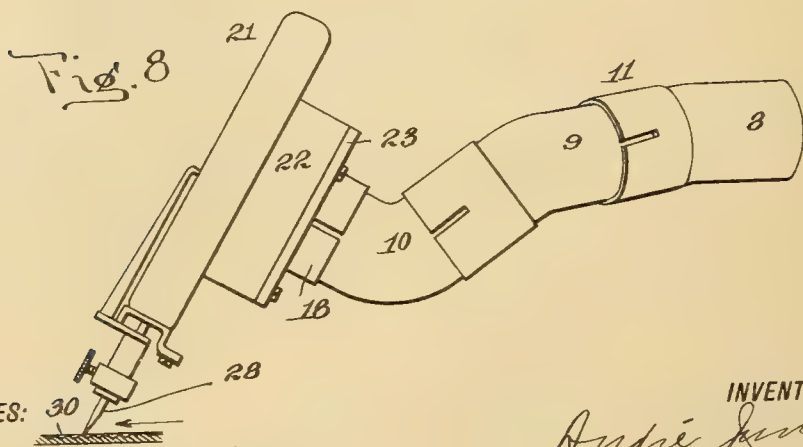
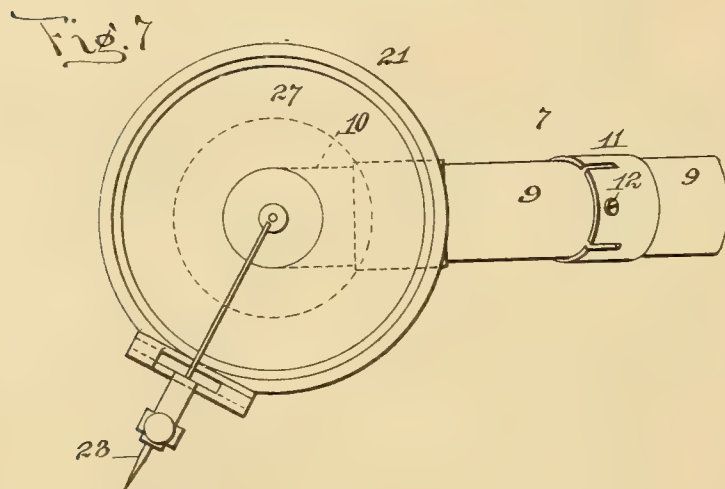
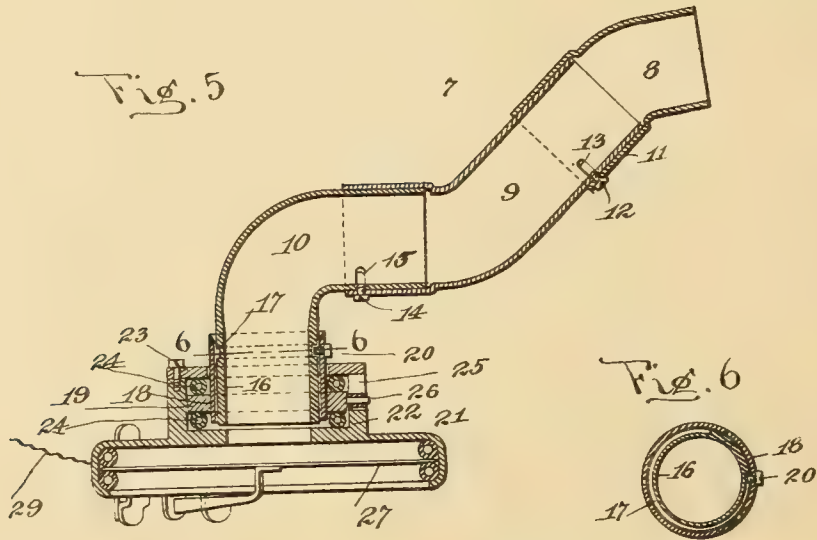
INVENTOR

André Junod.
BY
Waldo G. Morse
his ATTORNEY

1,259,242.

A. JUNOD.
ATTACHMENT FOR TALKING MACHINES.
APPLICATION FILED APR. 19, 1915.

Patented Mar. 12, 1918.
3 SHEETS—SHEET 3.



WITNESSES:

Elyah F. Munn, Jr.
W. Jones

INVENTOR

Andrie Junod
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UNITED STATES PATENT OFFICE.

ANDRÉ JUNOD, OF NEW YORK, N. Y.

ATTACHMENT FOR TALKING-MACHINES.

1,259,242.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed April 19, 1915. Serial No. 22,320.

To all whom it may concern:

Be it known that I, ANDRÉ JUNOD, a citizen of the Republic of Switzerland, residing in the borough of Manhattan, city, county, and State of New York, have invented a certain new and useful Attachment for Talking-Machines, of which the following is a specification.

My invention relates to that type of talking machine employing a record carried on the face of a disk which is revolved by a suitable motor, and has for its object to produce a device whereby a sound-box or reproducer may be employed for the purpose of reproducing sound from a disk having a sinuous record groove in which the reproducing stylus is moved laterally relatively to the face of the disk, and the same reproducer may be employed to reproduce sound from a disk having a vertically cut record groove in which the stylus is moved in the direction perpendicular to the plane of the disk.

A further object is to produce a device whereby the position of the sound-box may be reversed to give access to the needle holder without reversing or in any way altering the position of the tone-arm or any part thereof.

A further object is to produce a device in which the sound vibrations set up by the diaphragm will be caused to travel into and through the tone-arm without encountering obstructions and without making sharp turns.

These and further objects will more fully appear in the following specification and accompanying drawings considered together or separately.

In the drawings,

Figure 1 is a plan view of my device operating in conjunction with a record disk having a sinuous or lateral cut groove;

Fig. 2 is a side elevation of the same;

Fig. 3 is a view similar to Fig. 1, but showing the device engaging a vertical cut record;

Fig. 4 is a side elevation of the same;

Fig. 5 is an enlarged detail sectional view of a reproducer in position to operate on a sinuous groove record;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a side elevation of the parts shown in Fig. 5; and

Fig. 8 is an enlarged side elevation of the

device in position to operate on a vertical cut record.

In all the several views like parts are designated by similar reference characters.

1 represents a table which in practice forms the top of a cabinet in which is located the motor usually employed in talking machines of the type illustrated in the embodiment shown, and 2 designates a portion of the drive shaft of such motor. Carried on the end of the motor shaft which projects through the table 1 is a turntable 3, which supports a record disk 4. Extending through the table is a sleeve which offers communication with a horn or diffuser (not shown) below the table, and a tubular tone-arm 5 is loosely mounted in the upper end of the sleeve so as to move horizontally relatively thereto. The outer end of the tone-arm is provided with a movable member 6 which has a rotary movement on a horizontal axis, and a flexible connection 7 is removably secured to said member.

The connection 7, in the embodiment illustrated, is composed of three elbow joints 8, 9 and 10. One end of the joint 8 is introduced into the member 6, and its other end is provided with a socket 11 into which fits one end of the elbow 9. That end of the elbow 9 which engages in the socket 11 is provided with a slot 13 which is engaged by a screw 12 carried by the socket 11. The screw 12 retains the end of the elbow 9 in position, but allows it to turn to the limits of the slot. The joint 9 is provided with a similar socket which carries a screw 14 which engages a slot 15 in one end of the joint 10. The bores of the joints 8, 9 and 10 are of the same diameter, and the bends are in the forms of easy curves. This construction permits of the free passage of the sound waves set up by the diaphragm in their passage to the horn.

The free end of the elbow 10 is elongated, as at 16, and is provided with a circumferential groove 17 which extends around approximately 270° of the circumference of the part 16. The part 16 carries a sleeve 18 which is provided with a collar 19 near one end. The sleeve also carries a screw 20 which projects into the groove 17 and secures the sleeve in position, at the same time limiting the rotation of the sleeve to the length of the groove.

A sound-box or speaker 21 is carried on

the sleeve 18, by means of the following instrumentalities: The back of the sound-box is provided with an annular flange 22, and within this flange is seated the flange 19 of the sleeve 18. On each side of the flange 19 is an elastic cushion 24, and the outermost cushion is held in position by a cover 23 through which the sleeve projects. The sockets on the elbow joints 8 and 9 and the sleeve 18 are provided with slits to increase their elasticity and permit them to make close fits with their coöperating parts without binding.

The flange 22 is provided with a slot 25 which is engaged by a pin on the flange 19 which will prevent the latter from turning relatively to the former.

The sound-box is provided with the usual diaphragm 27, and with a stylus or needle 28. I have shown the stylus 28 as the ordinary steel needle, but it will be understood that any approved form of reproducing point may be employed.

The operation of my improved device is as follows: When used in connection with a sinuous record groove the sound-box and connection 7 are in position, as shown in Figs. 1, 2, 5, 6 and 7, that is with the connection in an approximately horizontal position as viewed from the side and with the rearward portions of the joints 8 and 9 extending in the same general direction as the axis of the tone-arm, as viewed from above. The outer extremity of the joint 10 will extend at right angles from the horizontal plane of the tone-arm, and the plane of the diaphragm will be substantially that of the vertical plane of the tone-arm, and substantially the same as that of the record groove 29 at the point of engagement of the needle and at right angles to the surface of the record. The stylus will engage the groove on the same plane as that of the diaphragm, and the movement of the needle, caused by its engagement with the sinuosities of the groove will be perpendicular to the plane of the diaphragm.

When it is desired to use a disk having a vertical cut or "Edison" groove, the sound-box is rotated in the anti clock-wise direction

for approximately 270° until its rotation is arrested by the screw 20, the sound-box is then turned over toward the center of the turn-table, and the elbow joints 9 and 10 will rotate in the sockets of the joints 8 and 9 respectively until arrested by the screw 12 and 14 reaching the ends of the slots 13 and 15 respectively. This will bring the sound-box into the position shown in Figs. 3, 4 and 8, that is with the plane of the diaphragm at right angles to the path of travel of the sound-box across the record caused by the spiral convolutions of the record groove 30, and at an angle of approximately 60° to the face of the disk. The vertical cut groove traveling in the direction of the arrow in Fig. 8, will cause the diaphragm to vibrate, and the sound waves set up by such vibrations will travel along the unobstructed bore of the connection 7 to the tone-arm and horn.

When it is desired to remove or introduce a needle, the sound-box may be rotated until the needle clamp is brought to the top without raising the connection.

In accordance with the provisions of the patent statute, I have described the principle of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative, and that the invention can be carried out in other ways without departing from the spirit of my invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent of the United States, is as follows:

A device of the character described, having a sound-box, a chamber on the sound-box, a sleeve within the chamber, cushions between the sleeve and chamber, a support engaging the sleeve, a groove in the support, and means on the sleeve for engaging the groove.

This specification signed and witnessed this 24th day of March, 1915.

ANDRÉ JUNOD.

Witnesses:

G. R. PATCHEN,
GEORGE W. BELWENS.

TALKING MACHINES.

1,259,258 ----- F. Malocsay,
Filed Apr. 19, 1915,
Patented Mar. 12, 1918.

1,259,258.

F. MALOCSAY.
TALKING MACHINE.
APPLICATION FILED APR. 19, 1915.

Patented Mar. 12, 1918.
2 SHEETS—SHEET 1:

Fig. 1

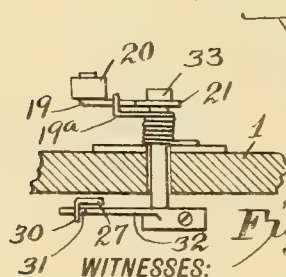
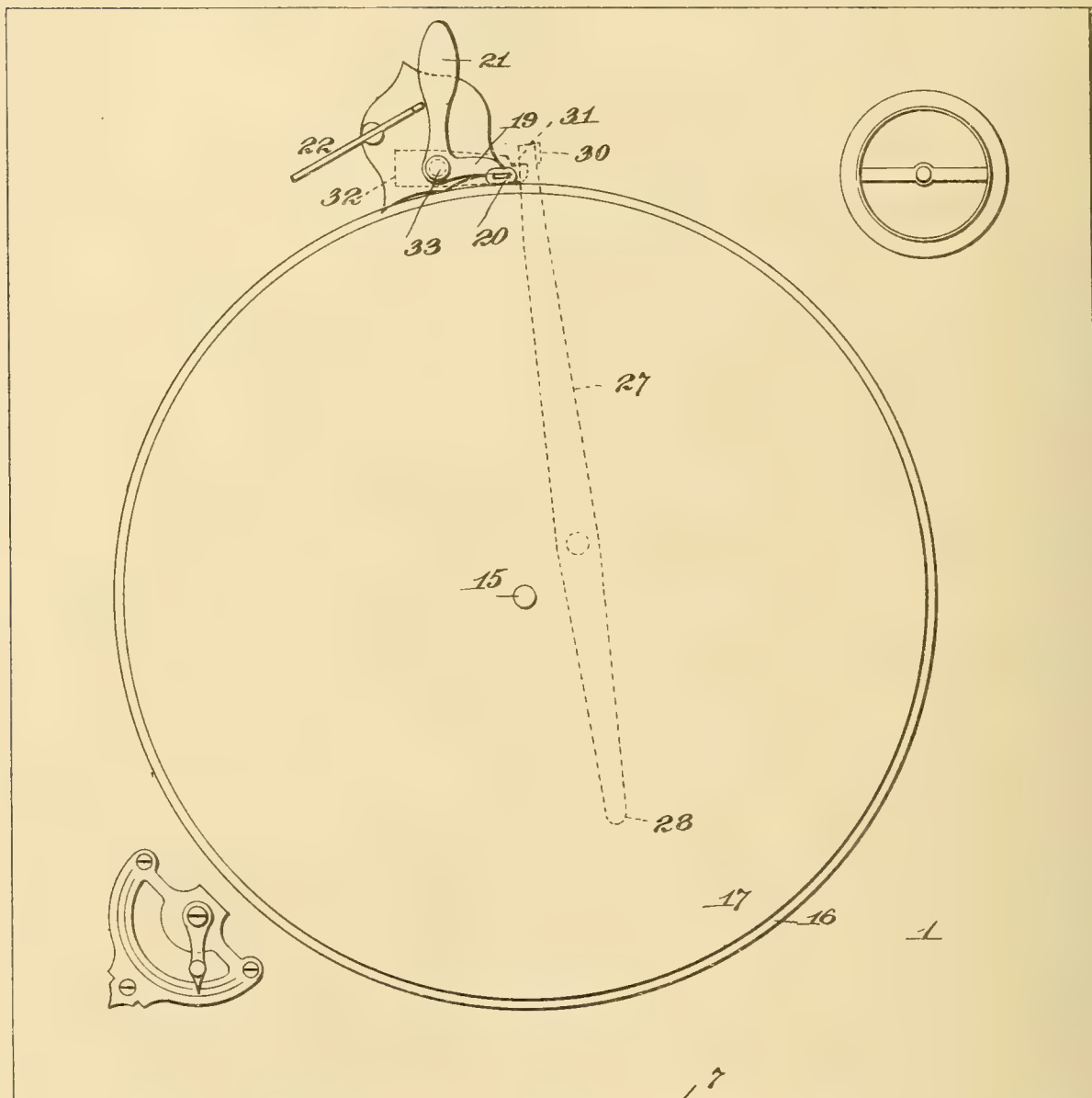


Fig. 4

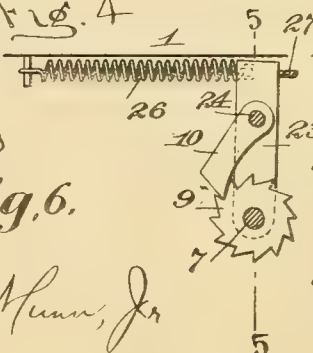
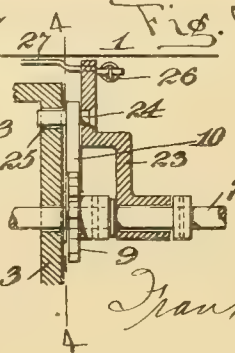


Fig. 5



WITNESSES:
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INVENTOR
Frank Malocsay
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Fig. 2

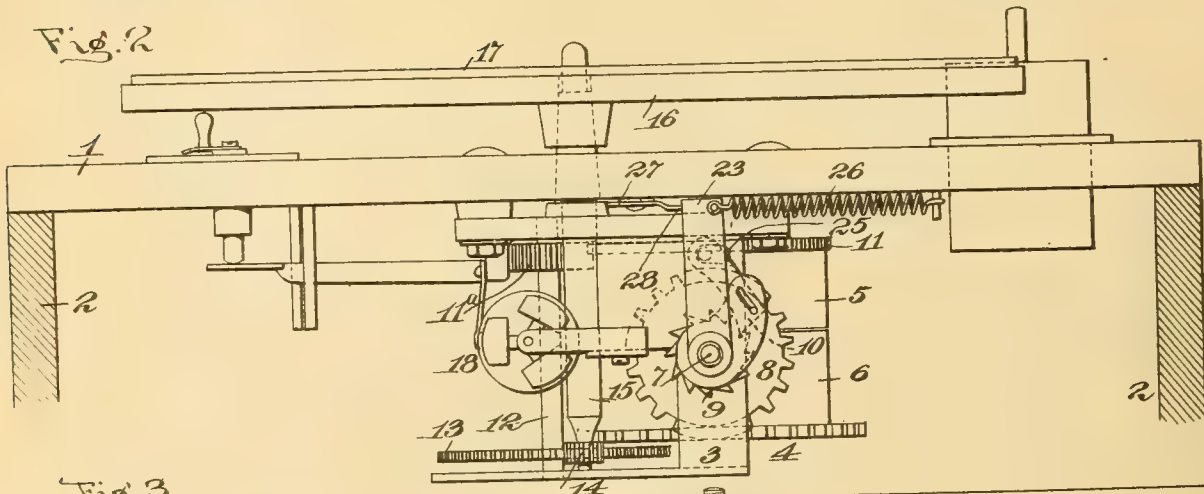
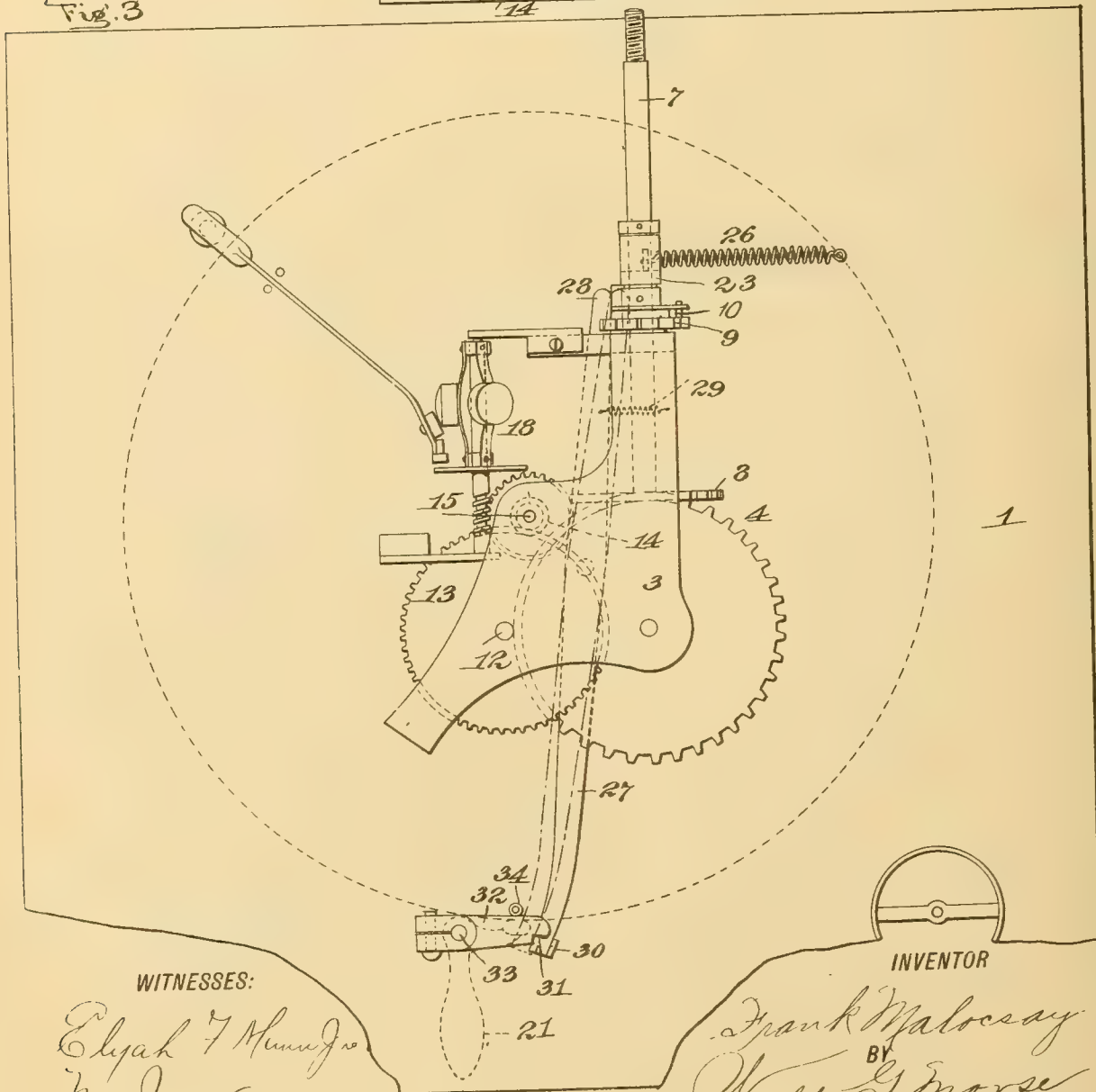


Fig. 3



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK MALOCSAY, OF NEW YORK, N. Y., ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

TALKING-MACHINE.

1,259,258.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed April 19, 1915. Serial No. 22,321.

To all whom it may concern:

Be it known that I, FRANK MALOCSAY, a citizen of the United States, residing in the borough of the Bronx, city, county, and State of New York, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

My invention relates to talking machines, and more particularly to that type of such machines which employs a disk record carried on a revolving turntable driven by a spring motor which must be wound up by a manual operation, and has for its object to produce a device which will give an indication as to when the motor is in need of re-winding.

Another object is to so design and construct the apparatus that when there is not sufficient spring power to play the record on the turntable, the machine cannot be started.

A further object is to produce a device which will render it unnecessary to rewind the motor until it has run down to such an extent that it will not have sufficient power to play a full record.

A further object is to prevent the motor running down and stopping after a record has been started and before it has been finished.

These and further objects will more fully appear in the following specification and accompanying drawings considered together or separately.

I have illustrated the preferred embodiment of my invention in the following drawings in which similar reference characters designate the same parts in all of the figures, and in which—

Figure 1 is a top plan view of a disk talking machine with the cover and part of the mechanism removed.

Fig. 2 is a side elevation of the operating parts of the same with the casing in section, the view being taken from the winding side.

Fig. 3 is a bottom plan view of the parts shown in Fig. 1.

Fig. 4 is a detail sectional view taken on the line 4—4 of Fig. 5;

Fig. 5 is a section on the line 5—5 of Fig. 4.

Fig. 6 is a detail sectional view showing the brake lock.

In the drawings, 1 designates the top

board of a cabinet of any approved construction, which is carried on side members 2, 2. Secured to the under side of the board 1 is a frame 3, carrying a spring motor 4. The motor comprises a pair of spring barrels 5 and 6 which inclose a heavy spiral spring. The outer end of the spring is attached to the barrel member 6 and the inner end is secured to the barrel member 5. A winding shaft 7 journaled in the frame extends through a side member of the casing, and is provided with a screw threaded portion for the reception of a crank, by means of which the motor may be wound. The inner end of the shaft 7 carries a spur pinion 8 which meshes with a face gear on the barrel member 6 to rotate the latter and wind the spring.

The winding shaft is provided with a ratchet wheel 9 which is engaged by a gravity pawl 10 to prevent turning of the winding shaft when the spring is unwinding. The pawl is raised from the ratchet wheel during its forward movement by the engagement of a pin carried thereby, with an inclined slot in a keeper carried on the winding shaft. When the unwinding of the motor rotates the shaft backward the keeper is moved in the same direction, the pin slides down in the slot, and the pawl is seated in engagement with the ratchet. This part of the apparatus forms no part of the present application. The barrel member 5 carries a spur gear 11 which meshes with a pinion 11^a on a counter shaft 12 which also carries a spur gear 13 in mesh with a pinion 14 on a turntable shaft 15.

The shaft 15 projects through the top 1 of the casing, and has removably secured thereto a turntable 16 on which rests a disk record 17. The shaft 15 has geared thereto a governor 18 which is regulated by means of a crank lever operated from the upper sides of the top 1.

A brake lever 19 is mounted on the top 1 and carries a brake shoe 20 which is adapted to engage the periphery of the turntable and prevent rotation thereof. The brake shoe is normally held in engagement with the turntable by means of a spring 19^a and is provided with an operating handle 21 and with a latch 22 to hold it out of engagement with the turntable and allow the latter to be rotated by means of the motor spring. The top 1 is provided with a sleeve by means of

which a tone-arm carrying a sound-box may communicate with a horn concealed in the casing.

Loosely mounted on the shaft 7 at one side of the frame 3 and extending upward is a lever 23, and this lever carries a stud 24 to which the pawl 10 is pivoted. The stud extends through the frame 3 which is provided with a slot 25 for this purpose. The slot acts as a stop to limit the sidewise movement of the lever 23. The lever 23 has attached to the end thereof a helical spring 26, the other end of which is secured to the under side of the top 1. The tendency of the main or motor spring to rotate the winding shaft backward tends, through the pawl 10, to swing the lever 23 to one side, and this movement is resisted by the spring 26.

Pivoted to the under side of the top 1 and extending across the motor in the embodiment illustrated, is a lever 27, one end 28 of which bears against the lever 23 at the side opposite the point of attachment of the spring 26. A spring 29 holds the end 28 of the lever 27 in engagement with the lever 23. The opposite end of the lever 27 is provided with a lip 30 adapted to engage a notch 31 in the end of an arm 32, carried on the lower end of the shaft 33 of the brake lever 19 as shown in Fig. 6 and in dotted lines in Fig. 3. A stop 34 is provided to limit the movement of the arm 32.

The spring 26 is so proportioned that when the motor spring is wound to its full extent its tendency to rotate the winding shaft backward will engage the ratchet 9 with the pawl 10, and move the lever 23 against the tension of the spring 26, but when the motor spring has run down to such an extent that it will not rotate the turntable long enough to cause the stylus of the sound-box to traverse the entire record carried on the largest disk which may be used on the machine, the tension of the spring 26 will overcome that of the motor spring and move the lever 23 in the opposite direction.

The operation of my improved device is as follows:

The motor is equipped with a long running spring capable of playing, with one winding, a great number of records, and when it is wound, records may be played, and when it is desired to change records and needles, the brake is applied and the motor stopped. When a new record is in place the brake is released and the record is rotated under the stylus.

When the records are being played the tension of the motor spring will overcome that of the spring 26, the lever 23 will be moved against that spring and against the end 28 of the lever 27. The last mentioned lever will be moved against the tension of the spring 29, and the lip 30 will be moved out of the path of the arm 32, so that when the

brake is applied to stop the motor it may be released without the arm coming in contact with the lip 30. When, however, the motor spring has run down to such an extent that it will not drive the turntable long enough to cause the stylus to traverse the record groove on the largest disk capable of being used on the machine, the tension of the spring 26 will overcome that of the motor spring and pull the lever 23 to the right in Fig. 2, and away from the end 28 of the long lever 27. The spring 29 will pull the short end 28 of the lever 27 to the right in Fig. 3, and bring the lip 30 into the path of the arm 32. When the brake is now applied to stop the motor, the rounded end of the arm 32 will engage the lip 30 and move the lever 27 to the right in Fig. 3, against the tension of the spring 29. When the notch 31 comes opposite the lip 30 the spring 29 will swing the lever to the left as shown in dotted lines in Fig. 3, the notch in the arm will engage the lip and the brake will be locked against the turntable and cannot be released. The brake cannot now be released by a manual operation and this will notify the operator that the motor spring requires rewinding and the brake cannot be released until the motor spring is rewound to such an extent that its tension will overcome that of the spring 26, and move the lever 23 to the left in Fig. 2, which in turn will swing the lever 27 against the tension of the spring 29, and move the lip 30 from the path of the end of the arm 32.

In accordance with the provisions of the patent statutes, I have described the principle of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative, and that the invention can be carried out in other ways without departing from the spirit of my invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent of the United States, is as follows:

1. A talking machine having a turntable, a spring motor rotating the turntable, a brake, means for applying the brake, and means operated by the motor for preventing releasing of the brake when the power in the motor is insufficient to play a complete record.

2. A talking machine having a spring motor, a brake, means for securing the brake in inoperative position, means for applying the brake to arrest rotation of the motor, and means operated by the motor for preventing the release of the brake mechanism when there is insufficient power in the motor to play a complete record.

3. A talking machine having a turntable, a motor for rotating the turntable, a brake

for arresting the movement of the turntable, and means governed by the motor spring for locking the brake in engagement with the turntable.

5 4. A talking machine having a turntable, a spring motor for rotating the same, a brake for arresting the movement of the turntable, and means whereby the unwinding of the spring will permit the brake to
10 be locked in engagement with the turntable.

5 5. A talking machine having a turntable, a spring motor for rotating the same, a brake for arresting the movement of the turntable, and means, operable when the
15 spring reaches a predetermined degree of expansion, to lock the brake in engagement with the turntable.

20 6. A talking machine having a turntable, a spring motor for rotating the same, a brake for arresting the movement of the turntable, and means, operable when the spring reaches a predetermined degree of expansion, to lock the brake in engagement with the turntable, and means operable by
25 increased tension of the spring to permit releasing of the brake.

30 7. A talking machine having a spring motor, means for winding the spring of the motor, a brake, means for applying the brake to stop the motor, and means carried by the winding means for locking the brake in operative position.

35 8. A talking machine having a spring motor, means for winding the spring of the motor, a brake, means for applying the brake to stop the motor, and means carried by the winding means and operated by the unwinding of the spring for locking the
40 brake in operative position.

45 9. A talking machine having a spring motor, means operable in one direction to wind the spring, means for preventing reverse rotation thereof, a brake, means for applying the brake to stop the unwinding of the
50 spring, and means governed by the unwinding of the spring to lock the brake in position.

10. A talking machine having a spring motor, a winding shaft for the motor, a
50 ratchet securely fastened on the shaft, an

arm loose on the shaft, a stop for the arm, a pawl on the arm engaging the ratchet, a spring connected to the arm and acting to oppose the unwinding tendency of the winding end of the spring, a lever engaged by the
55 arm, a brake, means for applying the brake to stop the motor, an arm on the brake, and means for engaging the lever with the brake arm to lock the brake in operative position.

60 11. A talking machine having a spring motor, a winding shaft for the motor, a ratchet securely fastened on the shaft, an arm loose on the shaft, a stop for the arm, a pawl on the arm engaging the ratchet, a
65 spring connected to the arm and acting to oppose the unwinding tendency of the winding end of the spring, a lever engaged by the arm, a brake, means for applying the brake to stop the motor, an arm on the
70 brake, and a spring for engaging the lever with the brake arm to lock the brake in operative position.

75 12. A talking machine having a turntable, a motor for rotating the turntable, a brake for arresting the movement of the turntable, and means governed by the motor spring for locking the brake in engagement with the turntable, when the motor has run to a
80 pre-determined point.

85 13. A talking machine having a turntable, a motor for rotating the turntable, a brake for arresting the movement of the turntable, means governed by the motor spring for locking the brake in engagement with
90 the turntable and for preventing releasing of the brake when the power in the motor is insufficient to play a complete record.

14. A talking machine having a spring motor, means for locking the motor against
90 rotation, and means operated by the motor for preventing the release of the locking means when the power of the motor is insufficient to play a complete record.

This specification signed and witnessed
95 this 24th day of March, 1915.

FRANK MALOCSAY.

Witnesses:

J. F. FLETCHER,

GEORGE W. BELWENS.

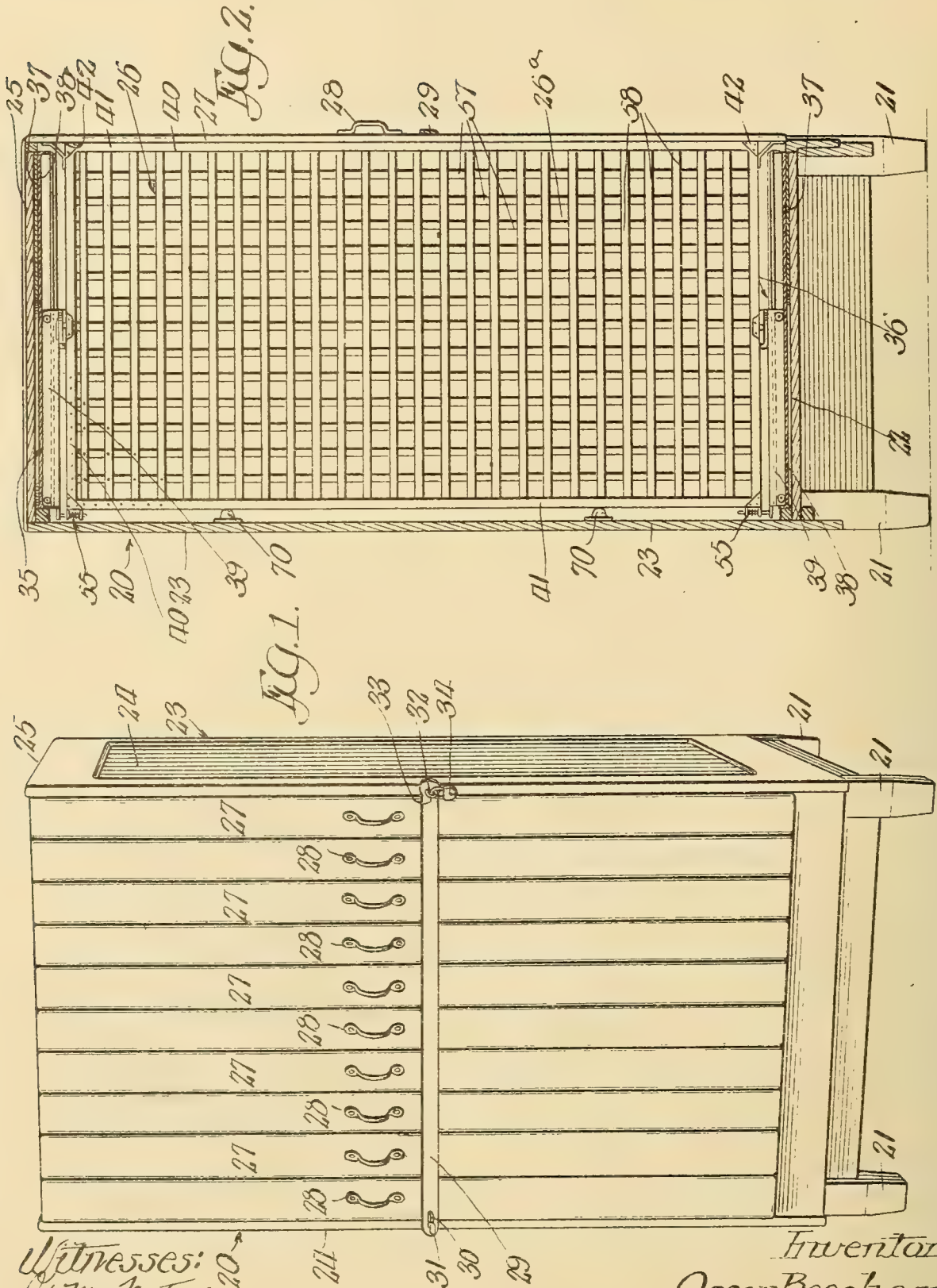


RECORD CABINET.

1,259,345 ----- O. Beecham,
Filed Mar. 12, 1918,
Patented Mar. 12, 1918.

1,259,345.

Patented Mar. 12, 1918.
 4 SHEETS—SHEET 1.

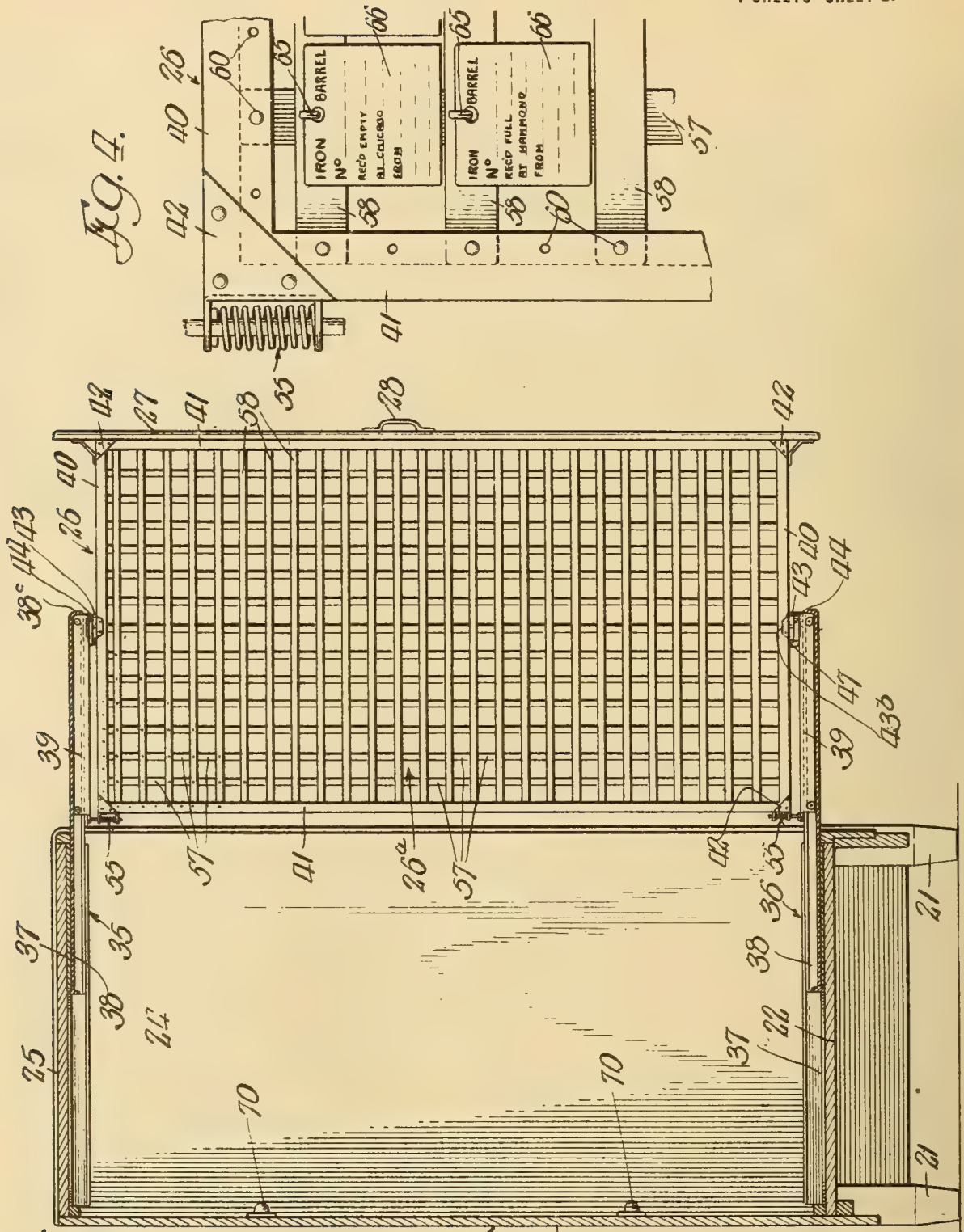


Witnesses:
 G. M. Fortin
 Harl W. Dall.

Inventor
 Oscar Beecham
 by Crow & Mehlhop Attys

1,259,345.

Patented Mar. 12, 1918.
 4 SHEETS—SHEET 2.



Witnesses:
 J. M. Forten
 Hare T. Dell

FIG. 3.

Inventor
 Oscar Beecham
 by Brown & Muhlhopfe Attys

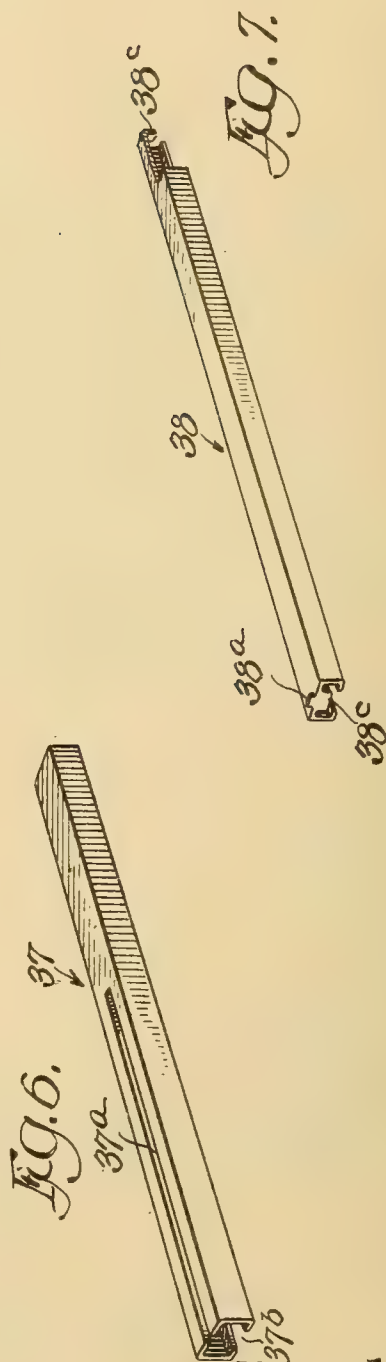
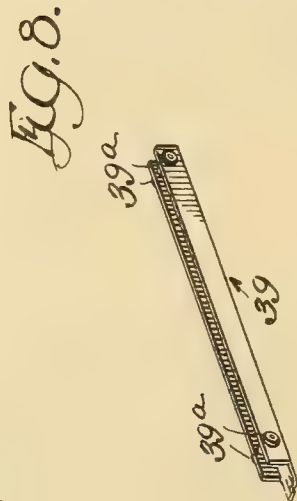
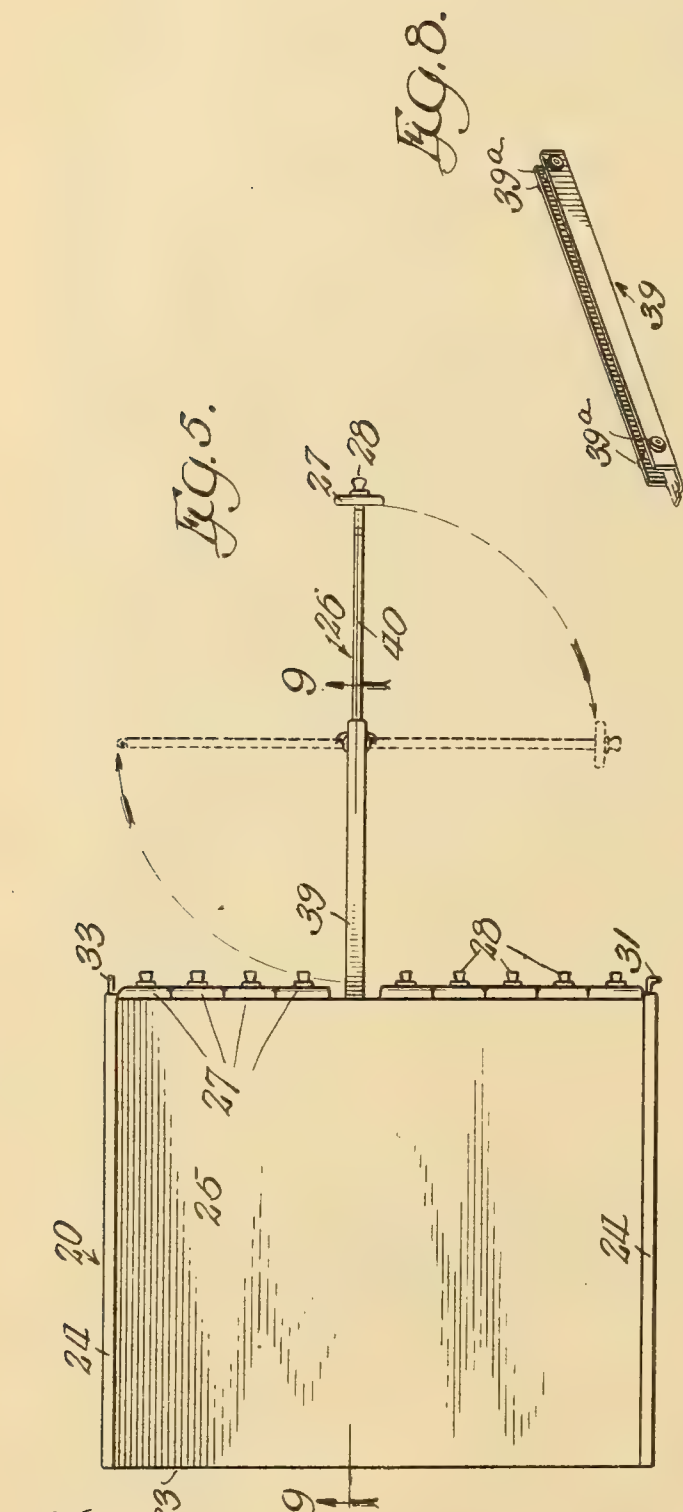
O. BEECHAM.
RECORD CABINET.

APPLICATION FILED APR. 21, 1915.

1,259,345.

Patented Mar. 12, 1918.

4 SHEETS—SHEET 3.

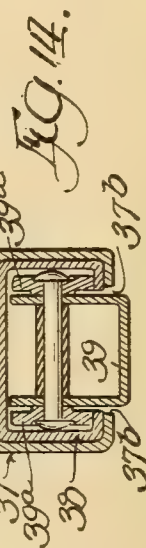
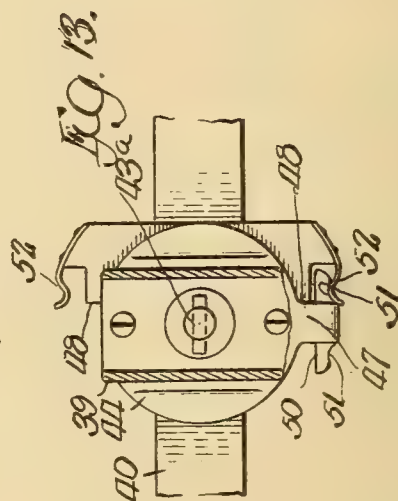
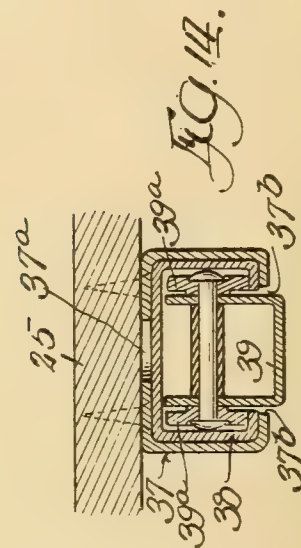
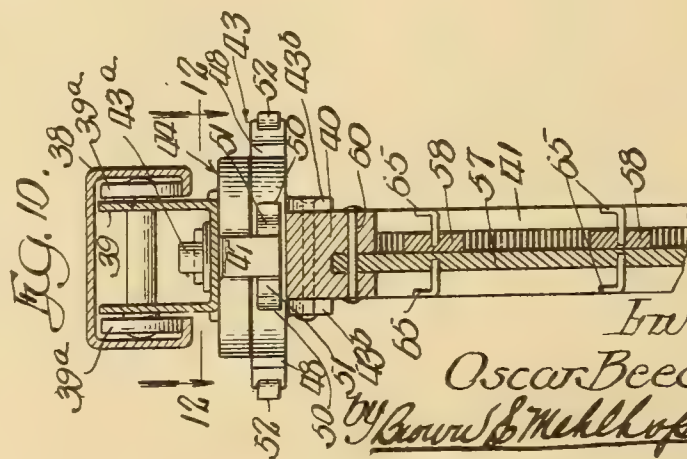
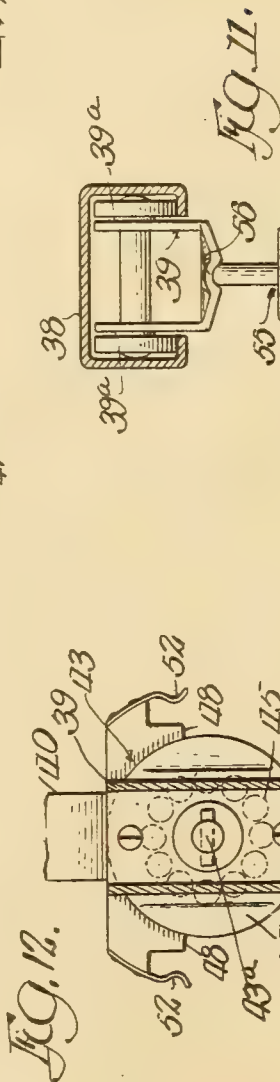
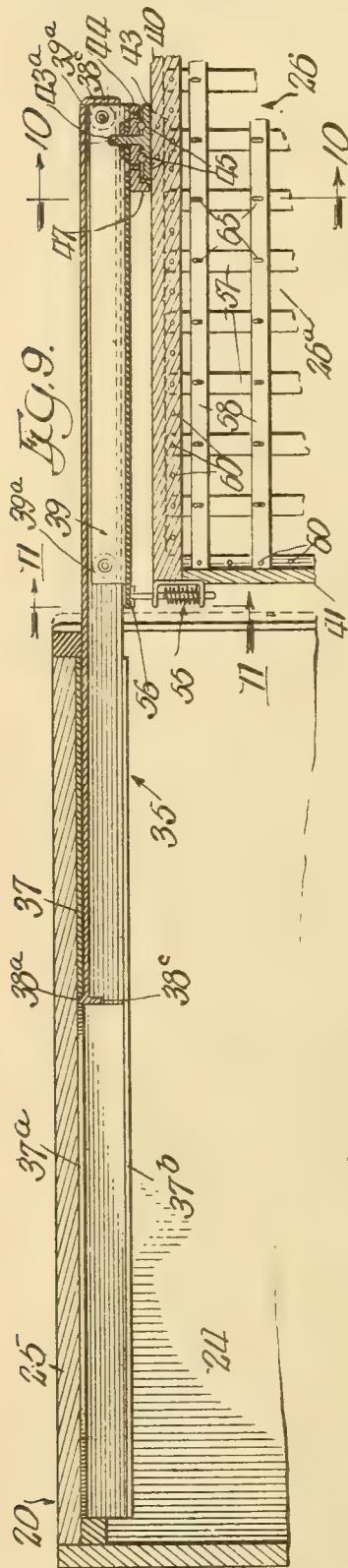


Witnesses:
J. M. Forten
Harold M. Ball

Inventor
Oscar Beecham
by Brown & Mehlhop Attys

1,259,345.

Patented Mar. 12, 1918.
 4 SHEETS—SHEET 4.



Witnesses:
 S. M. Fortan
 Karl W. Ball

Inventor
 Oscar Beecham
 By Brown & Meehl Attys

UNITED STATES PATENT OFFICE.

OSCAR BEECHAM, OF DEERFIELD, ILLINOIS.

RECORD-CABINET.

1,259,345.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed April 21, 1915. Serial No. 22,763.

To all whom it may concern:

Be it known that I, OSCAR BEECHAM, a citizen of the United States, and a resident of Deerfield, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Record-Cabinets; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved cabinet intended more particularly for use as illustrated herein, for containing display record boards or frames on which are carried record cards. The record cards may be arranged on each board either in numerical or in alphabetical order and may relate to any particular subject, as for example, to the location, disposition and condition of freight cars, of receptacles capable of continued reuse such as barrels, tanks, tank cars and the like or of other commercial articles.

The improved cabinet may also be used in connection with other records and its various advantages and its application to the use intended will be more clearly described as I proceed with my specification.

The invention consists of the matters hereinafter described and more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a view representing in perspective my improved cabinet.

Fig. 2 is a view representing a vertical central section through the cabinet.

Fig. 3 is a view representing a section similar to Fig. 2 with one of the record frames withdrawn beyond the limits of the body of the cabinet for the display and examination of the record cards carried thereby.

Fig. 4 is a view on an enlarged scale representing the upper left hand corner of one of the record frames with the record cards attached.

Fig. 5 is a top plan view of the cabinet with one of the record frames withdrawn from the body of the cabinet.

Figs. 6, 7 and 8 are detail perspective views of parts forming extension rails by means of which the record frames are withdrawn from the cabinet, as will be described more particularly in the specification.

Fig. 9 is a view representing on an en-

larged scale a partial horizontal section through Fig. 5 in a plane indicated by the line 9-9 of Fig. 5.

Fig. 10 is a view representing a section on a still further enlarged scale through Fig. 9 in a plane indicated by the line 10-10 of Fig. 9.

Fig. 11 is a view representing a section through Fig. 9 in a plane indicated by the line 11-11 of Fig. 9.

Fig. 12 is a view representing a section through Fig. 10 in a plane indicated by the line 12-12 of Fig. 10.

Fig. 13 is a view similar to Fig. 12 with the parts in a different relation.

Fig. 14 is a sectional detail view to be referred to more particularly later.

My improved cabinet comprises in general an upright case having fixed bottom, back, side and top walls and open in front and a plurality of record frames arranged in spaced relation in planes parallel to the upright side walls of the case and mounted in sliding relation within said case. The several frames are provided at their front ends with vertical members which project each side of the plane of the record frame and together form a front closure for the cabinet.

Each record frame is mounted on extension devices, one at the top and one at the bottom, which are capable of being withdrawn with the record frame in a plane parallel to the upright side walls of the cabinet and the record frame after being withdrawn completely from the cabinet, may be swung into a plane parallel to the front wall of the cabinet, locking devices being provided in connection with the extension devices for locking the said record frame in either a plane parallel to the upright side walls of the cabinet or in a plane parallel to the front wall of the cabinet.

The improved cabinet is of the same general character and may be used for the same purpose as the car record apparatus heretofore patented by W. E. Beecham on January 31st, 1899, bearing Number 618,388 and embodies certain novel improvements by means of which the record intended to be kept in the aforesaid apparatus and similar records may be kept more efficiently and economically and may be brought more readily to the attention and examination of those for whom the record is kept.

Referring now to that embodiment of my invention illustrated in the drawings:—

indicates the open case of the cabinet which is supported on legs 21, 21 and has a fixed bottom wall 22, an upright back wall 23, upright side walls 24, 24, and a top wall 25.

5 The walls of the cabinet and the legs are assembled and secured together in any familiar manner so as to make a rigid structure and are made of sufficient weight to withstand any overbalancing effect which
10 may be due to the weight of the record frames when they are withdrawn fully from the case and particularly when they are rotated into a plane at right angles to the front of the cabinet, in which case they will
15 exert the greatest overturning movement against the weight of the cabinet.

26 indicates the record frames of which in the example illustrated in the drawings there are ten. Each record frame has secured at its front end an upright flat strip
20 which extends at either side of the plane of the frame, the several strips dividing the open front of the cabinet into an equal number of sections. The top and bottom ends
25 of the several strips are adapted to engage against the front ends respectively of the top and bottom walls of the cabinet case, and the several strips are so fitted that when
30 all of the record frames are pushed home within the cabinet case, the cabinet will be snugly closed against the entrance of dust, dirt, etc. On the front strip of each record frame is attached a handle 28 for convenience in drawing the record frame from
35 the case.

I preferably provide means for locking all of the record frames within the case. As shown, this consists of a transversely extending bar 29 which has a longitudinal
40 slot 30 for detachable engagement with a hook 31 fixed to the front edge of one side wall 24 of the casing and a transverse slot 32 at the other end for the insertion of a staple 33 fixed to the other side wall 24 of
45 the case, and of a padlock 35 for locking the bar to the staple.

Each record frame is mounted on a pair of extension devices, namely, a top extension device 35 and a bottom extension device 36.
50 The top extension device consists of a slotted hollow bar 37 (see Figs. 6 and 9); of a smaller bar 38 (see Fig. 7) mounted to slide in said first named bar member and provided with coacting parts to be more particularly referred to later; and of a third
55 bar 39 (see Fig. 8) which is mounted to slide in the second named bar and which constitutes the carriage to which the record frame is directly attached. The three members referred to are duplicated at the top
60 and bottom of each record frame but are arranged in reversed relation.

The bar 38 has at its inner end a lug 38^a which engages in a longitudinally extending slot 37^a in the top of the hollow bar 37.
65

The slot 37^a extends from the inner end of said bar 37 throughout a little more than half way of its length. The bar 37 has in its bottom side a wider slot 37^b which extends through its entire length. The second bar 38 is arranged in telescoping relation within the hollow bar 37. 70

The second bar 38 is provided at each side with interiorly disposed channels providing top, bottom and side rails for rollers 39^a, 39^a 75 mounted at the ends and at each side of the bar 39. The bar 38 also has depending end flanges 38^c which are adapted to engage the ends of the carriage member to limit its inward and outward movement with respect 80 to the bar 38.

The hollow bar 37 is substantially equal in length to the depth of the cabinet from front to rear and is fixed to the top (or bottom wall) of the cabinet with the slot 37^b 85 facing downwardly or upwardly, as the case may be. The bar 38 is of the same length as the bar 37 and the bar 39 is of about half the length of the bars 37 and 38.

The construction and arrangement of the 90 extension members is such that when the record frame, which, as will be described, is attached to the third extension member 39, is withdrawn outwardly from the cabinet case, the first movement of the extension members will be the longitudinal movement of the bar or carriage 39 in its channel 38, said bar moving on its rollers 39^a on the rails provided therefor in the bar 38 until it strikes the depending flange 38^c at the outer 100 end of the bar 38. The further withdrawing movement of the record frame will then act to draw the bar 38 outwardly with respect to the fixed bar 37 and this movement will continue until the lug 38^c strikes the 105 end of the slot 37^a in the bar 37. This limits and determines the outward movement of the record frame. Of course the movement of the extension members at the bottom of the frame will be the same. 110

The parts are so proportioned and the slots so arranged with reference to the length of the members that when the limit of the movement of all the parts is reached, (which may or may not occur in the order named,) 115 depending upon the friction of the parts, the record frame will have been withdrawn completely beyond the vertical plane of the outer face of the cabinet.

Each record frame is mounted near the 120 outer ends of its associated extension bar 39 in such manner as to be capable of rotative movement about its vertical median axis, as shown in the drawings.

The record frame 26 consists of top and 125 bottom members 40 and front and rear members 41. Said frames are braced at each of the four corners by means of angle plates 42. The means by which the top and bottom bars are attached to the extension device are the 130

same so that the description of one will answer for both.

To the top frame member 40 there is fixed a bearing disk 43 having a central pin 43^a rising therefrom. Said pin is fixed in the vertical median line of the record frame. As shown, the disk is provided with flanges 43^b which are bolted through the top frame member. To the extension member 39 there is fixed at the outer end an apertured disk 44 through the aperture of which extends the pin 43^a. Preferably an anti-friction ball-race and balls 45 are provided between the two disks. In this manner the record frame is rotatively mounted on the top and bottom extension members 39. The top disk 44 has a radially extending tongue 47 which is adapted for engagement with either of two radially extending shoulders 48 on the lower disk 42. This construction provides stops to arrest the record frame in either of two positions in a plane parallel to the plane of the front of the cabinet, that is, one position with one face of the record frame facing toward the front, and the second position with the other face of said record frame facing toward the front. The tongue 47 is provided with laterally extending lugs 50, having grooves 51 adapted for locking engagement with leaf springs 52 fixed in position adjacent the two shoulders 48, so as to lock the record frame in either of the two positions mentioned.

At the top and bottom of the record frame there are provided on its inner edge, yielding, spring-controlled plunger rods 55 which are adapted for engagement with notches 56 formed in the bottom (or top surface, as the case may be) of the carriage bar 39. By this construction the record frames are normally locked in a vertical plane of their respective extension devices. To the back wall of the case are fixed elastic bumpers 70 (see Fig. 3) arranged in vertical rows in the planes of the record frames to reduce the shock when said frames are pushed into the cabinet.

The body of the record frame 26 is provided with a lattice work 26^a. Said lattice work as shown comprises a plurality of equally spaced vertically extending slats 57 and a plurality of similarly spaced horizontally extending slats 58. Each of the record frame members is provided on its inner edge with grooves to receive the ends of the slats forming the lattice work and have apertures 60 for the receipt of bolts, screws or pins to fix said slats in place. Said apertures are preferably spaced at equal graduated distances. (See Figs. 4 and 10). The grooves in one pair of frame members (that is to say, the top and bottom, for example) are placed on one side of the median vertical plane of the record frame and the other frame members (that is, the upright side

members,) are placed on the opposite side of said plane. Thus when the horizontal slats have their ends fixed in the grooves of the vertical frame members, and the vertical slats have their ends fixed in the grooves of the top and bottom frame members, both sets of slats will lie with their engaging faces in said plane.

At the crossing of each of the slats and on opposite sides of the record frame are fixed hooks 65 and on these hooks are hung the cards 66 upon which the records to be carried on the record frames are hung. (See Fig. 4.)

The advantages of my improved construction will appear from the description heretofore given. When the record cards on any frame are to be examined, the said frame may be easily withdrawn fully from the case after the locking bar is removed. When thus withdrawn, it may be swung into a plane parallel to the front face of the case, wherein it will receive the best effect of light and in which position also the various cards may be most easily gotten at. After the records have been examined or new records placed or replaced upon the frame, a mere swing of the frame without other attention, brings it back into locked position in the plane of its carriage. A further movement, of course, will bring the reverse side of the frame to the front.

I claim as my invention:—

1. A record cabinet, comprising a case open at its front and having a top, a bottom, a back and side walls, a plurality of record frames slidably mounted in said case and adapted to be withdrawn through the open front, each frame having a strip at its front edge, the strips of all of said frames closing the open front of the case when all of said frames are entirely within said case, telescopic extension devices connecting each frame to said top and bottom walls, each extension device including a carriage, a bearing disk fixed to the middle of each frame on its top and bottom, co-acting bearing disks on the carriages associated with each frame, each frame being capable of being withdrawn from the case by means of its associated telescopic extension devices into a position wherein it may be rotated about said bearing disks into a position parallel with the open front of the case, and co-acting locking devices on said bearing disks for automatically locking said frame in said last mentioned position.

2. A record cabinet, comprising a case open at its front and having a top, a bottom, a back and side walls, a plurality of record frames slidably mounted in said case and adapted to be withdrawn through the open front, each frame having a strip on its front edge, the strips of all of said frames closing the open front of the case when all of said

frames are entirely within said case, telescopic extension devices connecting each frame to said top and bottom walls, each extension device including a carriage, a bearing disk fixed to the middle of each frame on its top and bottom, co-acting bearing disks on the carriages associated with each frame, each frame being capable of being withdrawn from the case by means of its associated telescopic extension devices, into a position parallel with the open front of said case, locking lugs on the carriage bearing disks, and springs on said record frame bearing disks adapted to automatically engage said locking lugs to hold said frame in said last mentioned position.

3. A record cabinet, comprising a case open at the front and having top, bottom, upright side and an upright back wall, the front edges of said top, bottom and side walls all being arranged in the same approximate vertical plane, a plurality of record frames slidably mounted to the upright sides of the case, the several frames being provided at their front edges with upright, laterally extending strips adapted to form

a closed front wall for the case in substantially the plane of the front edges of the case when the record frames are within the same, a plurality of pairs of telescopic extension devices connecting said record frames with said case, there being a pair of extension devices for each record frame, each pair of extension devices including a carriage upon which the associated record frame is rotatively mounted, means for yieldingly locking each record frame in its associated carriage in the plane of its extension devices, and means for yieldingly locking said frame in either of two positions at right angles to the plane of its carriage member, with either of its faces facing away from the front of the cabinet.

In testimony that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 12th day of April, A. D. 1915.

OSCAR BEECHAM.

Witnesses:

T. H. ALFREDS,
KARL M. DOLL.

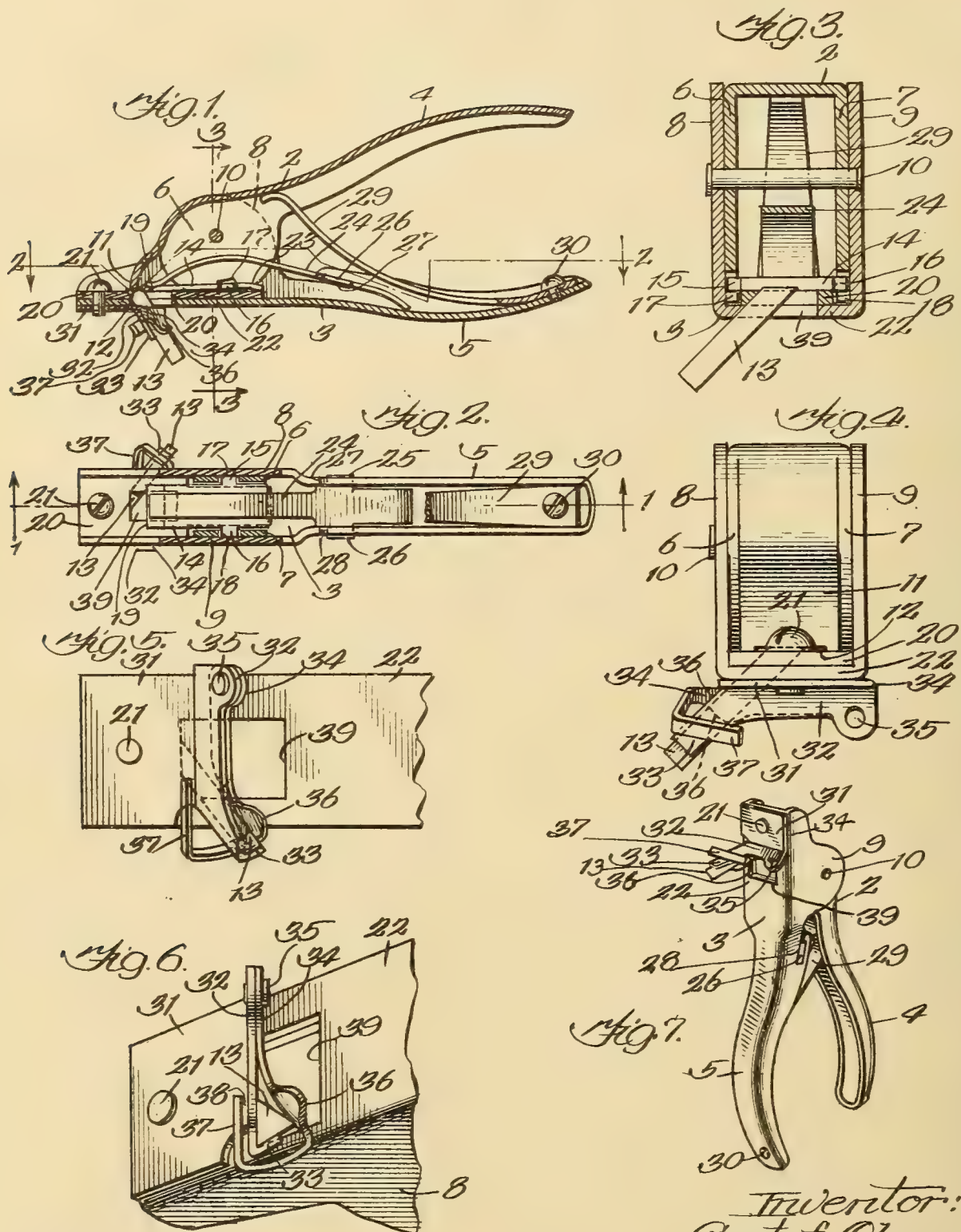
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

NEEDLE CUTTER.

1,359,434 ----- G. Olson,
Filed May 6, 1917,
Patented Mar. 12, 1918.

1,259,434.

Patented Mar. 12, 1918.



Witness
Jno H. Nelson.

Inventor:
Gustaf Olson.
By *Marcel P. Peterson*
att.

UNITED STATES PATENT OFFICE.

GUSTAF OLSON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO EDWIN F. ENGEL,
OF CHICAGO, ILLINOIS.

NEEDLE-CUTTER.

1,259,434.

Specification of Letters Patent.

Patented Mar. 12, 1918.

Application filed May 5, 1917. Serial No. 166,691.

To all whom it may concern:

Be it known that I, GUSTAF OLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Needle-Cutters, of which the following is a specification.

My invention relates to phonographs and has particular reference to improvements in means, tools or instruments for re-pointing the wood or fiber type of reproducer tracking point, and the invention consists in the novel construction of instrument for this purpose, its combinations and arrangement of parts, and its method of operation, all as hereinafter described in detail, illustrated in the accompanying drawing and more particularly pointed out in the appended claims.

In the drawing—

Figure 1 is a vertical section through an instrument embodying my invention.

Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged section taken substantially on the line 3—3 of Fig. 1.

Fig. 4 is a front, forward, or nose-end view, on an enlarged scale, of said instrument.

Fig. 5 is an enlarged plan view of the forward end broken away.

Fig. 6 is a perspective view of the portion shown in Fig. 5, but taken in a plane at right angles to the plane of Fig. 5.

Fig. 7 is a perspective view of the instrument as a whole in a position that is the reverse of that in which it is shown in Figs. 1 to 5.

In the several views 2 and 3 represent sheet metal stampings formed into plier-like bodies that include handles 4 and 5 and are pivoted together. On the member 2 are integral and parallel pivot disks 6 and 7 which lie against and between similar disks 8 and 9 on the member 5 and move on a pivot 10. On the member 2 is a forward or gage portion 11 with a recess 12 therein, the depth of which determines the extent to which the point end of a reproducer pin 13 may be moved past a flat knife or cutter 14. This cutter is reciprocated by rotation of the disks 6 and 7 the rotary movement of which is converted to a horizontal movement in the cutter by means of a pair of laterally extending lugs

15 and 16 on the cutter engaged by notches 17 and 18 in the disks 6 and 7. On the forward end of the cutter blade 14 is a beveled cutting edge 19 which is held against a flat slide-bearing plate 20 secured by a screw 21 seated in a bore in a flat body-portion 22 of the member 3. The rear end of the cutter blade 14 is slightly curved upward as at 23 to insure close contact of the cutting edge 19 with the plate 20 and to avoid unnecessary friction. This arrangement also tends to make the blade self-sharpening. A spring 24 bears against the cutter to hold it against its bearing plate, through which, as will hereinafter appear, the pin 13, to be re-pointed or sharpened, passes and is held against the pressure of the cutter. The spring 24 is held near its rear end in the member 3 through the medium of a laterally projecting pair of lugs 25, 26 on said springs seated in slots 27 and 28 in the handle portion of the member 3. The gage portion 11 is held normally pressed against the cutter plate 20 by a spring 29 the rear end of which is fastened by a screw 30.

A socket, sleeve, or pin holder is formed on a plate 31 which has a threaded bore for the screw 21 and serves as its nut. On said plate 31 is an outwardly bent portion 32 one end of which has an acute angle bend which forms a trough 33 that is longitudinally inclined toward an opening 39 through the plate 20 and toward the cutter at an angle of about 45 degrees, or the slant of cut usually made to form a point on the three-sided pins 13 commonly used. This V-shape trough 33 forms two sides of the pin-socket or passage and a third is formed by a flat spring 34 which lies flat against the part 32, is bent away from the latter opposite the V-shape trough and is fastened by a screw or rivet 35 to the part 32. This provides a movable side 36 to the three-sided pin socket. An extension thereof in the form of a finger 37 that is curved back of the V-shape trough serves as a stop limiting the movement of the movable side of the pin socket to the width of a space 28 between said finger and the part 32 and prevents accidental overbending and damage to the spring side of the socket. The pin 13, as shown, is projected through the socket and the rectangular bearing plate opening 39 until its point-end strikes the bottom of the slot 12 in the gage portion 11, and the for-

ward edge of said opening 39 firmly coöperates with the cutter in supporting the pin against the cutting action of said cutter. If said forward edge is sufficiently in advance of the gage end 11 to permit unobstructed passage of the pin 13 the length of the latter may be extended indefinitely and the instrument used to cut the desired pin lengths from a long rod of the proper cross section.

It will be noted that in this construction and arrangement the members 2 and 3 have a powerful leverage upon the cutter and that the latter moves in a straight line to make a clean, straight cut with slight exertion on the part of the operator.

I claim as my invention—

1. In a needle cutter, the combination with a pair of pivoted together and toward each other concaved members which form a housing or inclosure therebetween, of an edged cutter and needle-holding means on one of said members, a portion of the housing wall of the other member being arranged and formed to provide a needle stop, said other member being constructed and arranged to form an operating lever for said cutter.

2. The combination with a needle cutter, of a pair of concavo-convex members pivoted together and forming, substantially, a chamber for operating parts open only toward the rear ends and handle portions of said members, a cutter slidably mounted on one wall of said chamber and within said chamber, rotatable disks which form two opposite walls of said chamber, cutter-operating connections between said disks and

said cutter, and means between said members and within said chamber for, respectively, yieldingly holding the cutter against its slide-bearings and for holding said members in normal position relative to each other.

3. In a needle cutter, the combination with a member 3, of a bearing plate, a cutter slidably mounted on said bearing plate, a member 4 having thereon a part which forms a three-sided hood or cover over said cutter, interengaging parts on said cover and cutter whereby the latter is reciprocated by the former, a wall of said cover being arranged and constructed as a stop normally limiting the depth of insertion of a needle into the device, an expansible holder for a needle adapted to flexibly grip same, and a passage therefor through said bearing plate and member 3 in line with said holder.

4. The combination with a pair of members pivoted together and having parts integral therewith which form a chamber, of a cutter slidably mounted on one of said members and within said chamber, an expansible needle holder having an opening therethrough and into said chamber, and a pin stop which is the edge of the forward wall of said chamber normally interposed opposite said opening and movable out of alinement therewith to permit uninterrupted passage of a needle or of a needle blank or rod past said stop.

In testimony whereof I have hereunto signed my name.

GUSTAF OLSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH OR THE LIKE.

1,259,561 ----- J. & F. J. Russ,
Filed Sept. 1, 1917,
Patented Mar. 19, 1918.

J. & F. J. RUSS.
 PHONOGRAPH OR THE LIKE.
 APPLICATION FILED SEPT. 1, 1917.

1,259,561.

Patented Mar. 19, 1918.
 3 SHEETS—SHEET 1.

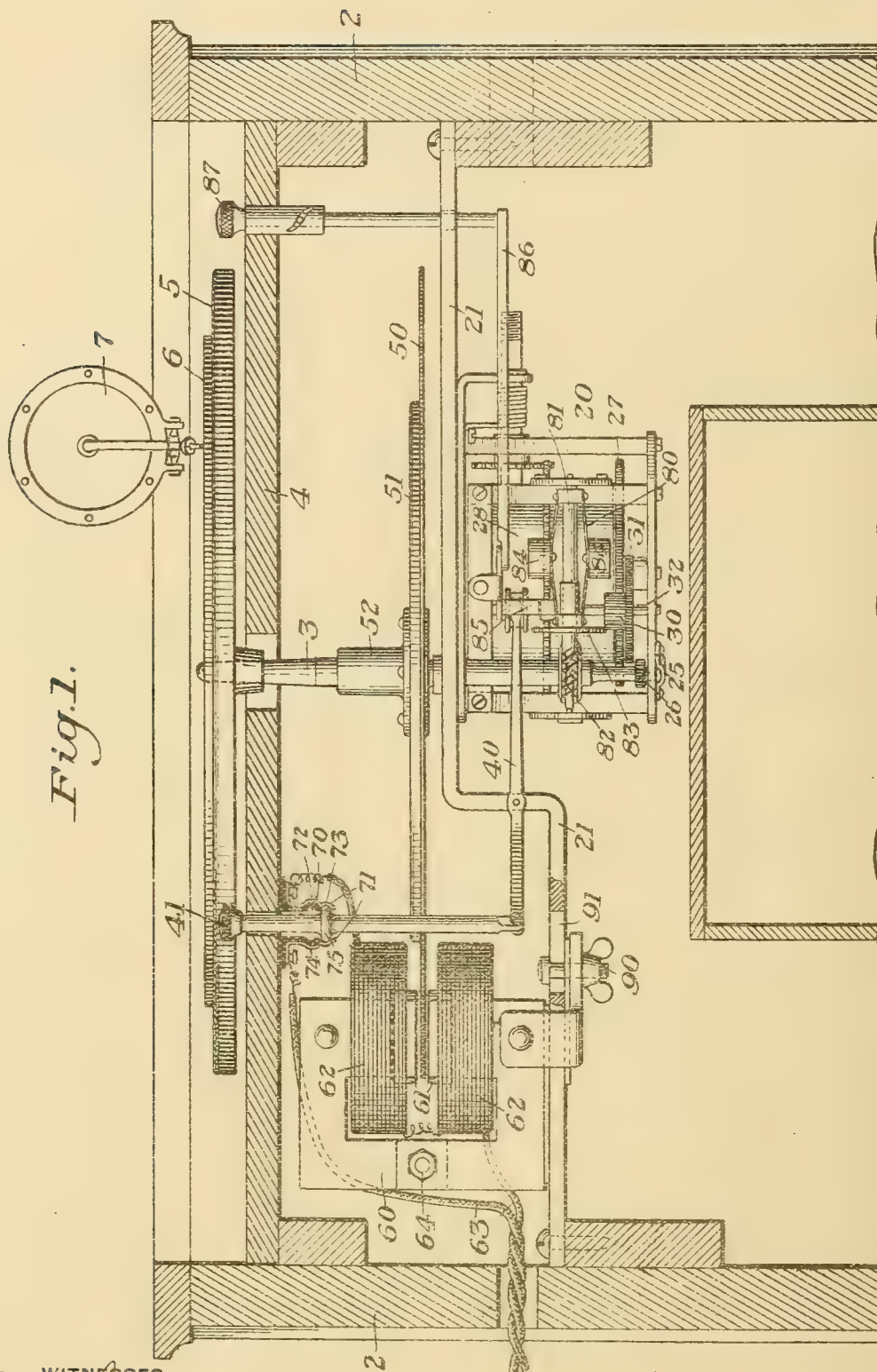


Fig. 1.

WITNESSES
 L. H. Johnson
 G. B. Blumling

INVENTORS
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 Frank J. Russ
 by their attorneys
 Robert H. Byrnes & Pannell

1,259,561.

J. & F. J. RUSS.
 PHONOGRAPH OR THE LIKE.
 APPLICATION FILED SEPT. 1, 1917.

Patented Mar. 19, 1918.
 3 SHEETS—SHEET 2.

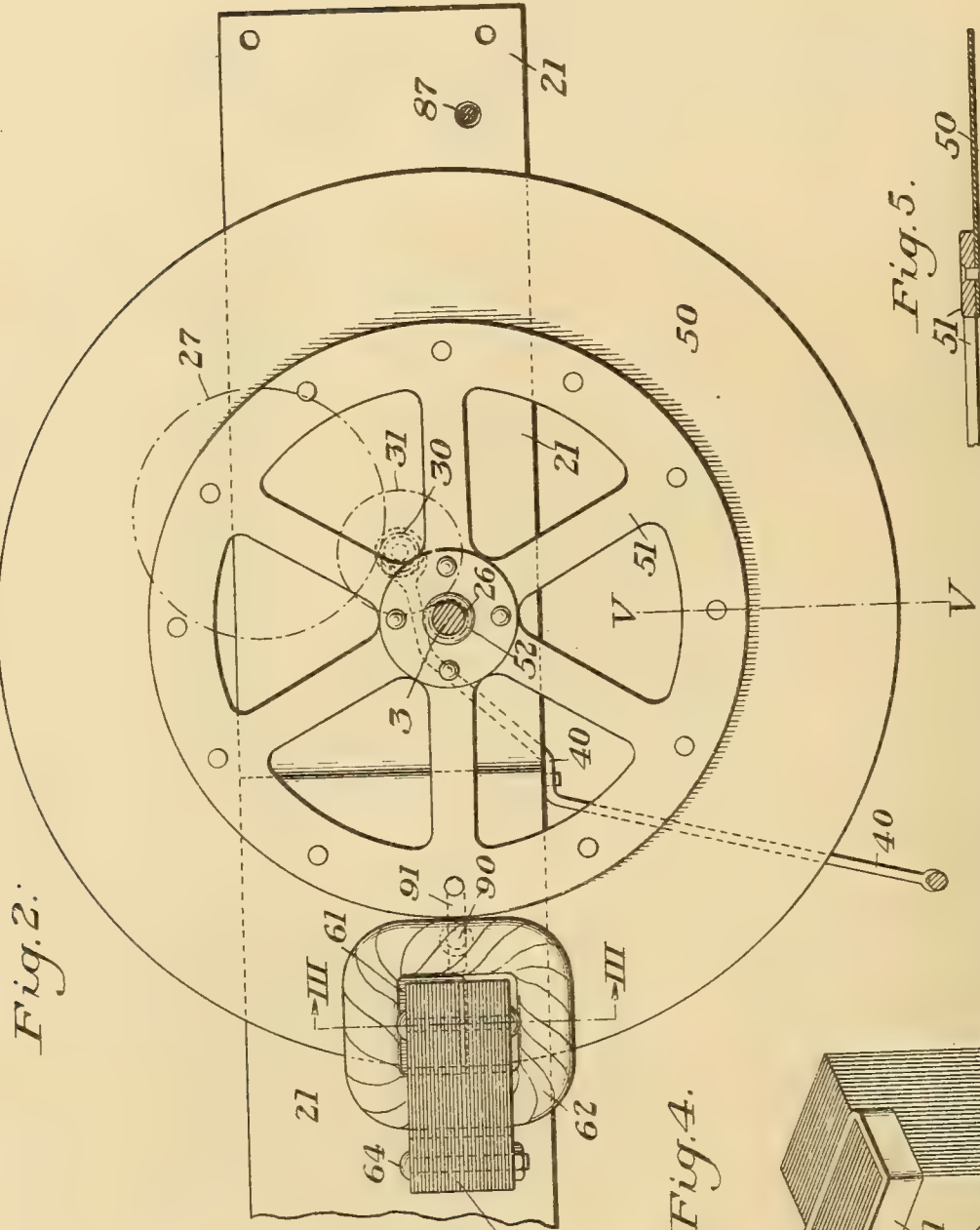


Fig. 2.

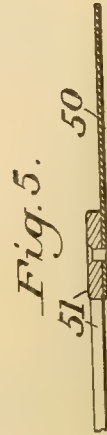


Fig. 5.

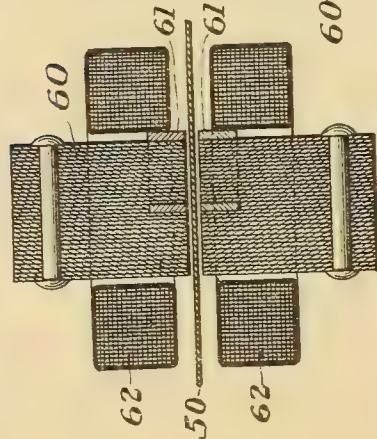


Fig. 3.

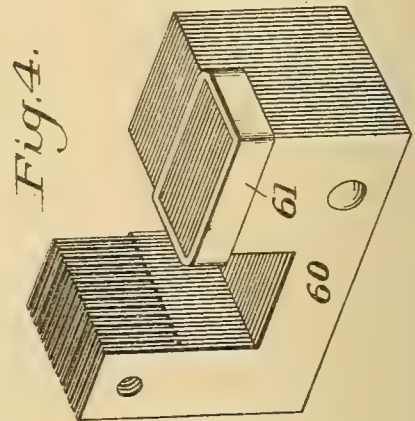


Fig. 4.

WITNESSES
L. H. Johnson
S. B. Blum

INVENTORS
John Russ
Frank J. Russ
 by their attorneys
Bohwell, Byrnes & Samuels

1,259,561.

Patented Mar. 19, 1918.
 3 SHEETS—SHEET 3.

Fig. 7.

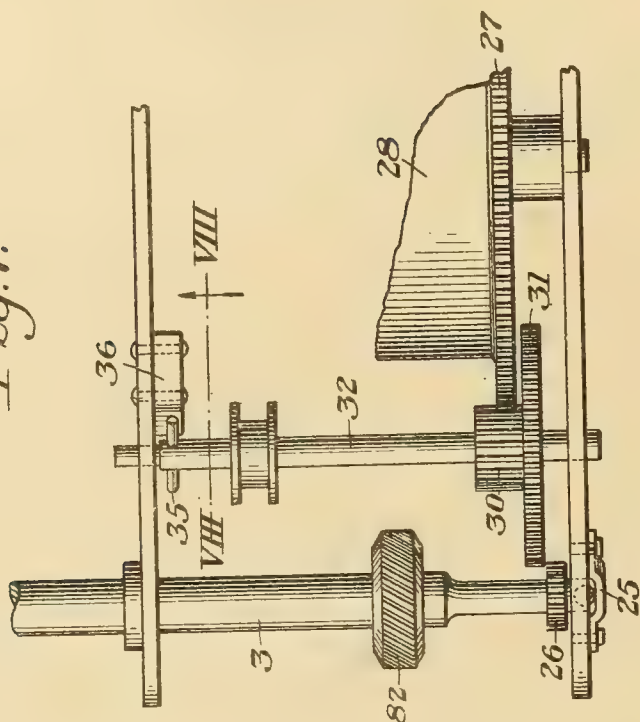


Fig. 6.

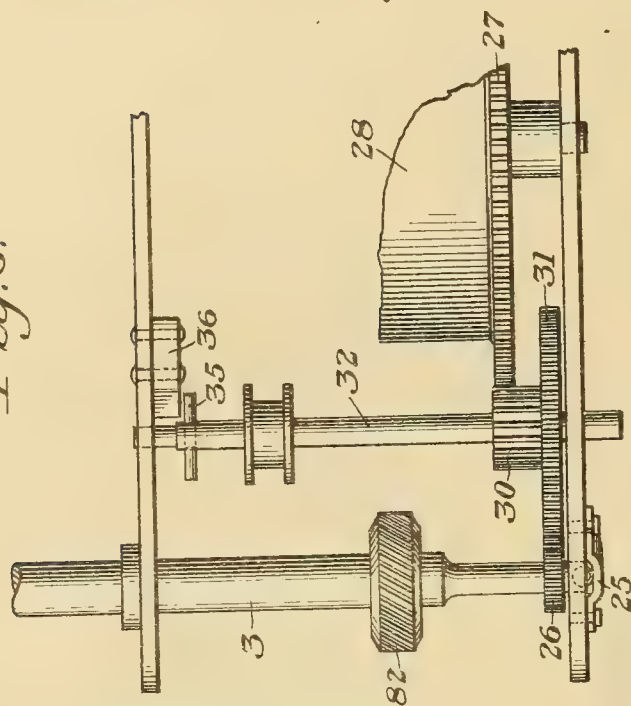


Fig. 8.

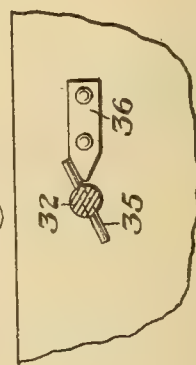
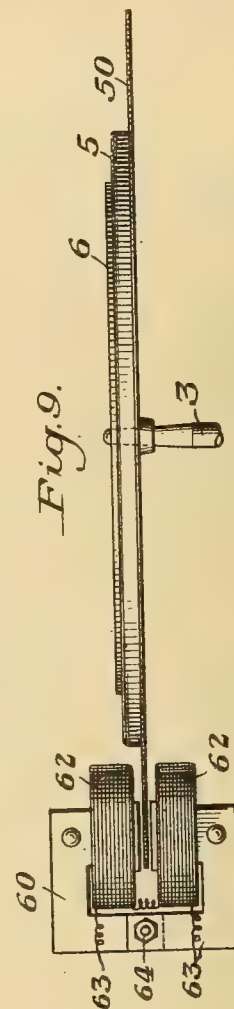


Fig. 9.



WITNESSES
L. H. Johnson
E. B. Blumling

INVENTORS
John Russ
Frank J. Russ
 by their attorneys
Bohwell, Byrnes & Samuels

UNITED STATES PATENT OFFICE.

JOHN RUSS, OF NORTH BRADDOCK, AND FRANK J. RUSS, OF PITTSBURGH, PENNSYLVANIA.

PHONOGRAPH OR THE LIKE.

1,259,561.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Application filed September 1, 1917. Serial No. 189,238.

To all whom it may concern:

Be it known that we, JOHN RUSS, a subject of the Emperor of Austria-Hungary, and a resident of North Braddock, Allegheny county, State of Pennsylvania, and FRANK J. RUSS, a citizen of the United States, and a resident of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Phonographs or the like, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which:—

Figure 1 is a front elevation taken in section through the casing of a phonograph embodying the invention.

Fig. 2 is a plan view of the driving plate and electro-magnet.

Fig. 3 is a vertical section along the line III—III of Fig. 2.

Fig. 4 is a perspective of one-half of the magnet core.

Fig. 5 is a fragmentary section along the line V—V of Fig. 2.

Figs. 6 and 7 are elevations of the spring motor clutch mechanism.

Fig. 8 is a bottom plan view taken on the line VIII—VIII of Fig. 7, and

Fig. 9 is an elevation showing a modification.

The present invention relates to phonographs or the like in which the object to be rotated, such as the phonograph record, is carried on a rotatable table which is rotated at a comparatively slow and constant speed. The present invention relates more especially to means for driving the rotatable table or record carrier.

Referring to the drawings, in which the invention is illustrated as embodied in a phonograph, the driving mechanism is inclosed in the phonograph casing 2. The rotary spindle 3 projects through the top 4 of the casing and supports the usual record holding table 5. A phonograph disk record 6 is shown as carried on the table. A needle operated reproducer 7 rests on the disk 6, the load radius on the table being in this case the distance from its axis to the point of contact of the reproducer needle.

The spindle 3 has a double drive, it being arranged to be driven either by an electric motor or by a spring motor. The spring

motor, indicated generally by the reference numeral 20, is hung from the supporting plate 21. The spring motor may be of any usual construction of spring motor employed for this purpose. The spindle 3 is driven by the spring motor through a clutch mechanism illustrated particularly in Figs. 6 and 7. The spindle 3 carries at its lower end just above the step bearing 25, the pinion 26. The pinion 26 is driven by the gear 27 on the spring carrying drum 28 of the spring motor through a pinion 30 and gear 31, which are carried on a shaft 32. The shaft 32 has a limited endwise movement to throw the gear 31 in and out of mesh with the spindle pinion 26, as shown in Figs. 6 and 7. A stop pin 35 is carried on the shaft 32 and is arranged to be arrested by a stationary stop or abutment 36 when the shaft 32 is raised, as shown in Fig. 7. This prevents the spring motor from running down when it is disconnected from the spindle. The shaft 32 is shifted to connect or disconnect the spring motor from the driving spindle through the lever 40 and operating handle 41.

The spindle 3 is also arranged to be directly driven electrically by means of an annular metallic plate 50, which is supported directly by the spindle 3. As shown in Figs. 1 and 2 of the drawings, the plate 50 is riveted to a spider 51, the hub 52 of which fits around the spindle 3. The annular plate 50 may, however, be otherwise supported by the spindle so as to directly drive it. For example, as shown in Fig. 9, the plate 50 may be carried at the edge of the record carrier 5. While for structural rigidity the plate 50 is preferably supported on the spindle 3 by means of a light but stiff spider, it is obvious that the annular plate 50 might be made in disk form, and the center of the disk be clamped to the spindle 3, and a disk form of plate is intended to be covered by the term "annular" as employed in the claims. The term "annular" as employed in the claims to describe the non-magnetic metallic plate is intended as a term of description and not of limitation, and to refer to the active area of the plate, and therefore to include any form of plate which has an annular area acted upon by the driving electro-magnet.

The plate 50 is driven by means of a

shaded pole alternating current electro-magnet 60 carried on the supporting plate 21. The electro-magnet 60 has a C-shaped laminated iron core. The pole pieces of the core
 5 extend into close proximity with the opposite sides of the plate 50. The pole pieces have copper straps 61 around one-half thereof to produce a "shading" or difference in phase for rotating the plate 50 by the
 10 eddy currents induced therein. The magnet coils 62 are carried by the pole pieces and are supplied through the lead wires 63 with single phase alternating current such as is usually employed for house lighting.

15 As shown in Figs. 1 and 4 the magnet core is formed in two parts, the laminations being arranged so that the core is split at the back, the plates lapping together as shown and being clamped by the bolt 64. This
 20 permits the magnet core to be readily assembled or disassembled to mount or replace the coils 62.

A switch 70 is inserted in one of the lead wires 63. The switch 70 may be of any suitable type. In the drawings the switch 70 is
 25 indicated as two spring plates 71 having upper and lower socket recesses 72 and 73. The recess 72 is lined with insulation 74. A conducting button 75 carried on the rod of
 30 the handle 41 fits in the sockets 72 and 73. When the handle 41 is raised the conducting button 75 is pushed into the upper socket 72 and the electric circuit is broken. When the handle 41 is pressed down the button 75 is
 35 pushed into the socket 73 and the circuit closed. The spring sockets 72 and 73 also serve to hold the handle 41 in raised or lowered position. When the handle 41 is raised to connect the spring motor to the spindle 3,
 40 the circuit of the electro-magnet is broken so that the operator cannot drive the record carrier electrically. When the handle 41 is depressed disconnecting the spring motor, the electro-magnet circuit is closed and the
 45 phonograph is in condition to be driven electrically when the current is switched on. When the electro-magnet 60 is deenergized, the plate 50 is driven idly and offers no resistance to the drive furnished by the
 50 spring motor. As shown in the drawings, the plate 50 is the only moving part in the electric drive, and as the plate 50 is supported directly by the spindle 3 without any gearing or clutch connections, no resistance
 55 is offered thereby to the rotation of the record carrier when the spring motor drives it.

The speed of rotation of the record carrier is accurately adjusted and maintained by
 60 means of a spring governor 80. The spring governor 80 may be of any usual construction. In the drawings it is indicated as comprising a horizontal spindle 81 driven by means of worm gear 82 from the spindle 3.
 65 A friction plate 83 is moved along the spin-

dle by means of the spring supported weights 84. A brake having a surface of felt or the like is carried on the end of an arm 85, the position of which may be adjusted by means of a lever 86 and handle 87. 70
 When the speed of rotation reaches normal the disk 83 is brought against the brake and the speed is frictionally held at the right point. The speed may be varied by the handle 87, as will be understood by those 75 skilled in this art.

The spring governor 80 is always operatively connected with the spindle 3 so as to furnish a common governor for both the spring motor and the electric drive. Both 80 the spring motor 20 and the spring governor 80 are preferably of standard type now used in phonographs. It will be apparent, therefore, that by the arrangement above indicated, the auxiliary electric drive can be 85 added with but slight change from the standard parts.

The speed at which the record carrier is electrically driven may also be varied adjusting the magnet 60 radially of the plate 50. 90 For this purpose a clamping bolt 90 and slot 91 are indicated. When a light load, such as that of a phonograph needle is carried, it is found that by moving the magnet 60 toward the axis of the plate 50, the angular 95 speed of rotation is increased and vice versa. Under all conditions a marked decrease in speed may be obtained by moving the magnetic pole pieces partially off the edge of the plate. 100

As shown, the record carrying table 5 and the plate 50 are both carried in the spindle 3 so that the record carrier is driven by the motor plate 50 directly and without any intermediate connection. The plate 50 is relatively large, having approximately the same 105 diameter as the record table 5, which is usually about 10 or 12 inches. This permits the necessary driving torque at the low plate speed required. The torque has been found 110 amply sufficient to play the large 14 inch Pathé records. The magnet 60 may, if desired, be constructed and adjusted so as to put little, if any duty on the spring governor 20. The magnet 60 tends to drive the plate 115 at a constant speed, and even without the spring governor 20, little, if any, variation in speed is observed as the reproducer needle travels toward the center of the record disk.

The present invention is particularly applicable to phonographs and has been described as applied thereto for rotating at a slow to constant speed the record carrying table. It is obvious, however, that the invention might be applied for slowly rotating 125 carriers or tables upon which other objects to be rotated are carried, such as tables for carrying advertising displays. The present invention is not limited to its illustrated embodiment, but may be embodied in 130

other structures within the scope of the following claims:

1. In a device of the character described, a rotatable spindle, a carrier supported on
5 the spindle for holding the phonograph record or the like which is to be rotated, an annular non-magnetic metallic plate also supported on the spindle, a shaded pole alternating current magnet for inductively driving
10 the plate, a spring motor, and a combined switch and clutch mechanism for breaking the circuit of the electro-magnet and simultaneously operatively connecting the spring motor with the spindle and
15 for closing the circuit of the electro-magnet and simultaneously disconnecting the spring motor from the spindle; substantially as described.

2. In a device of the character described,
20 the combination of a rotatable spindle, a carrier supported on the spindle for holding the phonograph record or the like which is to be rotated, an annular non-magnetic metallic plate supported on the spindle, and a
25 shaded pole alternating current electro-magnet for inductively driving the plate, a spring motor, a clutch for operatively connecting and disconnecting the motor and spindle, and a speed governor connected with the spindle
30 for controlling the speed of both the spring and the electric drive; substantially as described.

3. In a device of the character described, the combination of a rotary spindle, a carrier supported on the spindle for holding
35 the phonographic record or the like which is to be rotated, an annular non-magnetic metallic plate supported on the spindle and of a diameter not substantially less than that
40 of the carrier, and a shaded pole alternating current electro-magnet located adjacent to the rim of the plate for inductively driving it whereby a comparatively large torque slow-speed direct drive is applied to the ob-
45 ject to be rotated; substantially as described.

4. In a device of the character described, a rotatable spindle, a carrier supported on
the spindle for carrying the phonograph record or the like which is to be rotated, an an-
50 nular non-magnetic metallic plate supported on the spindle, a shaded pole alternating current electro-magnet for inductively driving the plate and thereby directly driving the object to be rotated, and means for varying
55 the speed at which the object is rotated comprising means for bodily shifting the electro-magnet radially with relation to the spindle; substantially as described.

5. In a device of the character described
60 a rotatable spindle, a carrier supported on the spindle for carrying the phonograph record or the like which is to be rotated, a non-magnetic metallic plate having its active

portion lying in a plane parallel to that of
the carrier and supported by the spindle so
as to directly drive it, and an alternating
current electro-magnet inductively associ- 65
ated with the plate for driving it and there-
by directly driving the object to be rotated,
the diameter relation between the portion of 70
said plate which is acted on by the electro-
magnet and the carrier being such that the
torque exerted by the magnet on said plate
will act through a lever arm not materially
shorter than the load radius on said carrier, 75
substantially as described.

6. In a device of the character described a rotatable spindle, a carrier supported on
the spindle for carrying the phonograph rec- 80
ord or the like which is to be rotated, a non-
magnetic metallic plate supported on the
spindle at a distance below the carrier and
having its active portion lying in a plane
parallel to that of the carrier and supported
by the spindle so as to directly drive it, and 85
an alternating current electro-magnet in-
ductively associated with the plate for driv-
ing it and thereby directly driving the ob-
ject to be rotated, the diameter relation be- 90
tween the portion of said plate which is
acted on by the electro-magnet and the car-
rier being such that the torque exerted by
the magnet on said plate will act through a
lever arm not materially shorter than the
load radius on said carrier, substantially as 95
described.

7. In a device of the character described, a rotary spindle, a carrier supported on the
spindle for holding the phonograph record
or the like which is to be rotated, a spring 100
motor geared to the spindle, an annular
non-magnetic metallic plate carried on the
spindle and a shaded pole alternating cur-
rent electro-magnet for driving the plate,
and means for operatively disconnecting the 105
spring motor from the spindle when it is
driven by the electric drive; substantially
as described.

8. In a device of the character described, a rotary spindle, a carrier supported on the
spindle for holding the phonograph record
or the like which is to be rotated, a spring 110
motor for driving the spindle, a non-mag-
netic metallic plate carried on the spindle
so as to directly drive it, and an alternating 115
current electro-magnet inductively associ-
ated with the plate for driving it and there-
by directly driving the object to be rotated,
and means for operatively disconnecting the
spring motor from the spindle when it is 120
driven by the electric drive, substantially as
described.

In testimony whereof, we have hereunto
set our hands.

JOHN RUSS.

FRANK J. RUSS.

BRAKE FOR PHONOGRAPHS.

1,259,596 ----- M. Bono
Filed Mar. 17, 1917,
Patented Mar. 19, 1918.

M. BONO.
BRAKE FOR PHONOGRAPHS.
APPLICATION FILED MAR. 17, 1917.

1,259,596.

Patented Mar. 19, 1918.

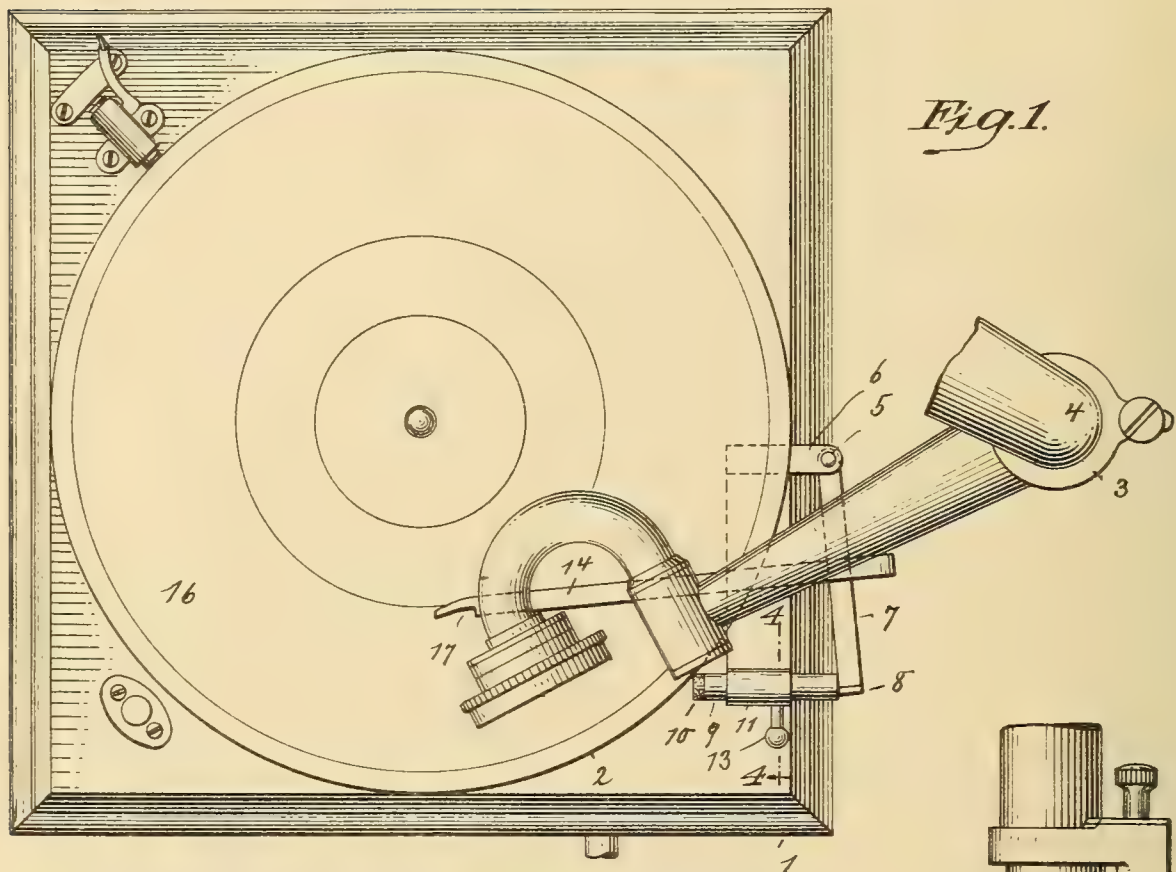


Fig. 1.

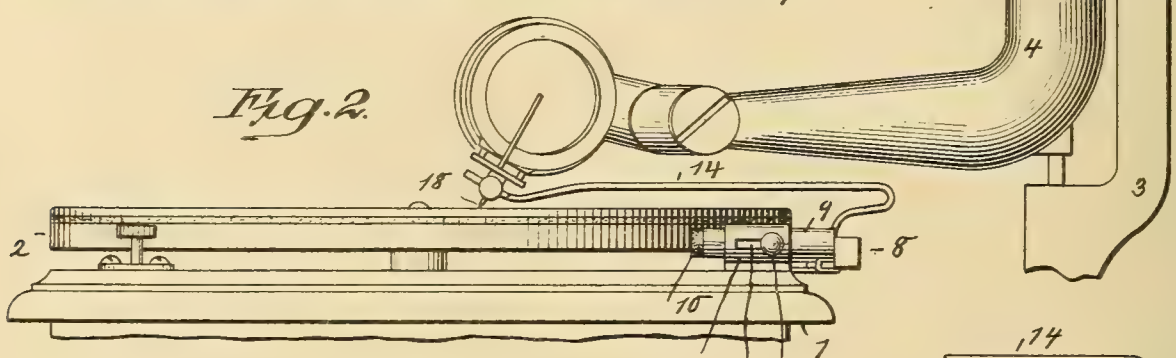


Fig. 2.

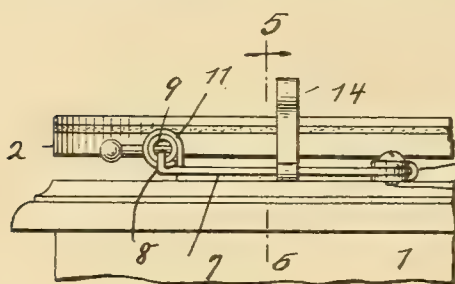


Fig. 3.

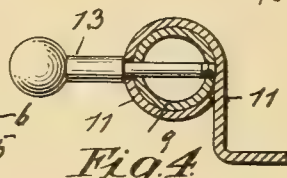


Fig. 4.

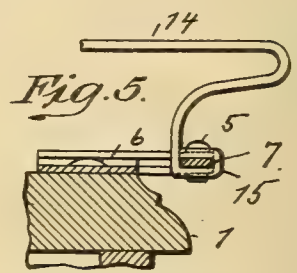


Fig. 5.

Inventor
Michelangelo Bono
By his Attorney
Frank W. Mierow

UNITED STATES PATENT OFFICE.

MICHELANGELO BONO, OF NEW YORK, N. Y.

BRAKE FOR PHONOGRAPHS.

1,259,596.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Application filed March 17, 1917. Serial No. 155,396.

To all whom it may concern:

Be it known that I, MICHELANGELO BONO, a citizen of Italy, and a resident of New York city, in the county and State of New York, have invented certain new and useful Improvements in Brakes for Phonographs, of which the following is a specification.

This invention relates to a novel phonographic brake which is simple in construction, may be readily set to engage the turn table with records of different lengths, and is reliable in operation.

In the accompanying drawing:

Figure 1 is a plan of a brake embodying my invention;

Fig. 2, a side view thereof;

Fig. 3, a front view;

Fig. 4, an enlarged section on line 4—4 of Fig. 1, and

Fig. 5, a similar section on line 5—5 of Fig. 3.

The casing 1 of the phonograph carries the turn table 2, and is furnished with a bracket 3 in which is mounted the pivoted tone arm 4, all as usual. At one side of casing 1, there is pivoted at 5 to a fixed bearing 6, a lever 7, having an upwardly bent end 8 that constitutes a pusher. This pusher is adapted to engage the rear end of a tubular plunger 9, into the front end of which is fitted a flexible plug 10 constituting a brake shoe, that is adapted to engage the turn table 2. Plunger 9 is movable within a tubular bearing 11 fastened to casing 1, and provided with a longitudinal slot 12, that receives a pin 13 extending from plunger 9, and constituting a stop that limits the play of the plunger.

Upon lever 7 is adjustable a finger 14, which is bent at its heel 15 around the lever, in such a manner that it may be readily moved along the same. This finger is adapted to be projected across the record 16 and is provided at its free end with a notch 17, adapted to be engaged by the stylus 18.

In use, the finger 14 is so set that its

notched end 17 will be positioned directly within the innermost groove of the record. When the piece of music has been played, the stylus by striking the finger will cause the latter to turn lever 7 on its fulcrum 5, so that pusher 8 will move plunger 9 inward and thus apply brake shoe 10 to turn table 2.

When a new record is to be applied, lever 7 is swung back to carry finger 14 off turn table 2, and plunger 9 is manually retracted within bearing 11.

By setting finger 14 nearer to or farther away from the fulcrum 5 of lever 7, the device may be readily adapted for records of different lengths.

It will be seen that my brake is simple in construction, reliable in operation, and that it may be readily applied to a phonograph without requiring any material alterations therein.

I claim:

1. A phonograph brake comprising a lever, pivoted to the phonograph casing, a finger adjustably engaging the lever and adapted to be projected across a record, and a brake shoe operatively engaged by the lever and adapted to be pushed by said lever against the record.

2. A phonograph brake comprising a lever, a finger adjustable thereon and adapted to be projected across a record, a bearing, a plunger slidable within the bearing and adapted to be pushed by the lever toward the record, and a brake shoe carried by the plunger.

3. A phonograph brake comprising a lever, a finger adjustable thereon and adapted to be projected across a record, a bearing, a tubular plunger slidable within the bearing and adapted to be pushed by the lever toward the record, a brake shoe fitted within the plunger, and means for limiting the axial movement of the plunger within the bearing.

MICHELANGELO BONO.

THE HISTORY OF THE UNITED STATES

OF THE

AMERICAN PEOPLE

FROM THE FIRST SETTLEMENTS TO THE PRESENT TIME

BY

JOHN F. JOHNSON, LL.D.,
OF THE UNIVERSITY OF CHICAGO,
AND
JOHN W. JOHNSON, LL.D.,
OF THE UNIVERSITY OF CHICAGO.

SIXTH EDITION, REVISED AND ENLARGED.

NEW YORK:
JOHN W. JOHNSON, LL.D.,
OF THE UNIVERSITY OF CHICAGO,
AND
JOHN F. JOHNSON, LL.D.,
OF THE UNIVERSITY OF CHICAGO.
1900.

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1900.

PHONOGRAPH.

1,259,645 ---- L. McArthur,
Filed Apr. 23, 1917,
Patented Mar. 19, 1918.

L. McARTHUR.
 PHONOGRAPH.
 APPLICATION FILED APR. 23, 1917.

1,259,645.

Patented Mar. 19, 1918.

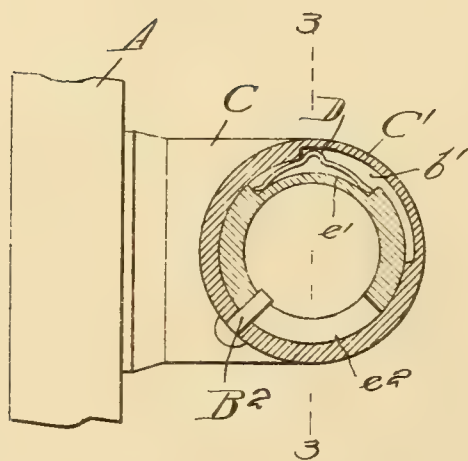
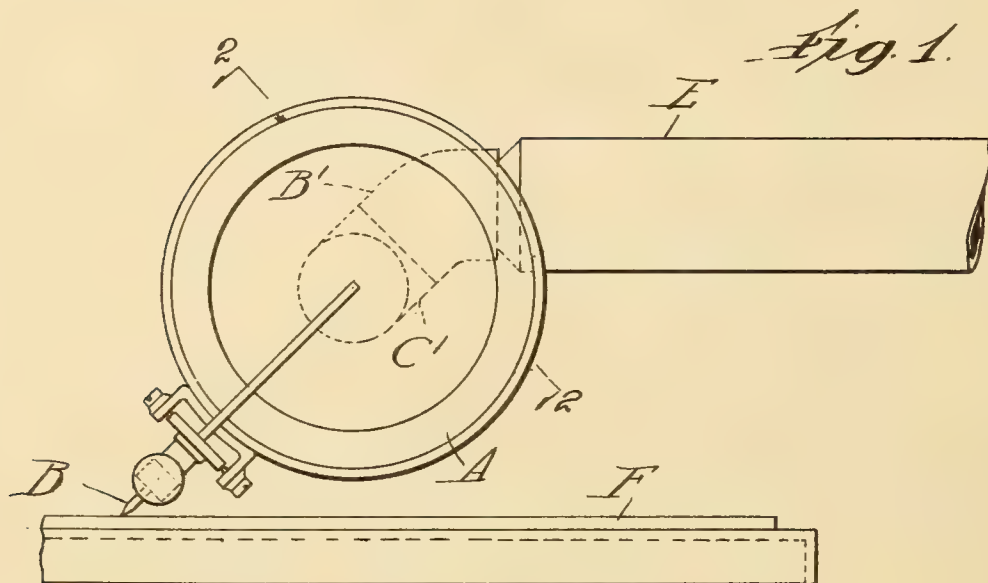


Fig. 2

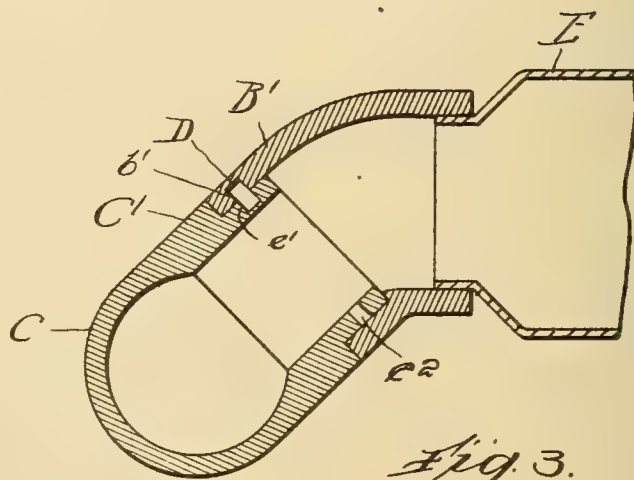


Fig. 3.

Witness
G. J. Smith

Inventor,
 Leslie M. Arthur:
 by *Burton Burton*
 his Attys.

UNITED STATES PATENT OFFICE.

LESLIE McARTHUR, OF KENILWORTH, ILLINOIS, ASSIGNOR TO STEWART PHONOGRAPH CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH.

1,259,645.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Original application filed November 24, 1916, Serial No. 133,139. Divided and this application filed April 23, 1917. Serial No. 163,777.

To all whom it may concern:

Be it known that I, LESLIE McARTHUR, a subject of the King of Great Britain, residing at Kenilworth, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonographs, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This application is a division of my pending application, Serial No. 133,139, filed November 24, 1916.

The purpose of this invention is to provide an improved construction in certain details of a phonograph or talking machine, so-called. It consists in the features and elements of construction shown and described, as indicated in the claims.

In the drawings:

Figure 1 is a detail side elevation of a portion of a phonograph comprising the tone arm and sound box mounted thereon, the same being shown in relation to the record with which the stylus on the sound box coöperates.

Fig. 2 is a section at the line, 2—2, on Fig. 1.

Fig. 3 is a detail section at the line, 3—3, on Fig. 2.

Referring to the drawings:—The reproducer or sound box, A, carrying the stylus, B, is connected to the tone arm, E, by means of an elbow on the tone arm having an obliquely-extending arm, B¹, which is inter-telescoped with an obliquely-extending arm, C¹, of the elbow, C, rigid with the sound box. The inclined elbow arms, B¹ and C¹, are mounted upon each other for relative rotation about their common axis, constituting a swivel connection between the tone arm and the sound box about whose axis the sound box may be adjusted from a position at which the stylus, B, may coöperate with a record, F, of the "zig-zag" type, to a position at which it may coöperate properly with a record of the "hill-and-valley" type. For the purpose of rendering this joint snug and adapted to cause the sound box to remain safely at either position to which it is adapted, and at the same time rendering said adjustment reasonable easy, the inter-telescoped parts at this joint,—said arms, B¹ and C¹,—are provided with recesses b¹

and c¹, at their inter-telescoped area, said recesses opening into each other and accommodating a bow-spring, D, having its middle part engaged in the recess in one of said members and its ends in the recess in the other member, and thereby reacting between the two members for holding the joint snug and providing a frictional resistance to the relative rotation of said members. The recesses, b¹ and c¹, are circumferentially extended so that the aggregate amount of play of the spring lodged therein circumferentially of the inter-telescoped members is the amount of the annular adjustment of the two members upon each other which is made for shifting the sound box from one of said operative positions to the other; and the spring thereby, together with the recesses in which it is lodged, constitutes the means for limiting this adjusting movement of the sound box. This spring being a flat spring, and the recesses in which it is lodged being channels in the respective members whose width is substantially that of the flat spring, said spring when engaged in the channels of the two members constitutes a key for retaining the two members together. It is understood that the two members will be engaged with the key spring therein by first placing the spring in the recess in the inner member, its ends being lodged in said recess, and compressing the middle point or bow to admit it into the other of said members, B¹, whereupon the two members being longitudinally telescoped to their stop shoulders, the recesses, b¹, and c¹, being thereby registered with each other, the bow of the spring will snap into the recess, b¹, and the members will be locked together. That they cannot be disengaged is not an objection. In case of breakage of the spring, it will be preferable to substitute an entire new joint rather than to undertake repairs. It may be considered desirable to provide for the locking together of the two inter-telescoped members, B¹ and C¹, and for limiting their relative rotation, not at one side only as by the spring above described, but at the opposite side also, and for that purpose the more familiar expedient may be employed, consisting of a pin, B², inserted from the outside through the outer of said members after they are inter-telescoped with each other,

engaging a circumferentially-extending slot, c^2 , in the inner of said members, the extent of the slot being that of the annular adjustment of said members which is to be provided for.

I claim:—

1. In a phonograph, in combination with a sound box, a tone arm, elbows on the sound box and tone arm respectively, and a tubular joint at which said elbows are connected, comprising inter-telescoped arms of the elbow adapted for relative rotation about their common axis, having their inter-telescoped parts recessed, forming a cavity between them, and a bow spring lodged in said cavity, re-acting between said inter-te-

scoped parts for frictionally resisting their relative rotation.

2. In a phonograph, in combination, a sound box tone arm, and a tubular joint at which the sound box and tone arm are connected, comprising inter-telescoped members adapted to rotate relatively about their common axis, said members having at their inter-telescoped portions recesses forming a cavity between them, and a spring lodged in said cavity, re-acting on both said parts for frictionally resisting their relative rotation.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 20th day of April, 1917.

LESLIE McARTHUR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPHS.

1,259,681 ----- R. Thomas,
Filed Mar. 15, 1917,
Patented Mar. 19, 1918.

1,259,681.

Patented Mar. 19, 1918.
 2 SHEETS—SHEET 1.

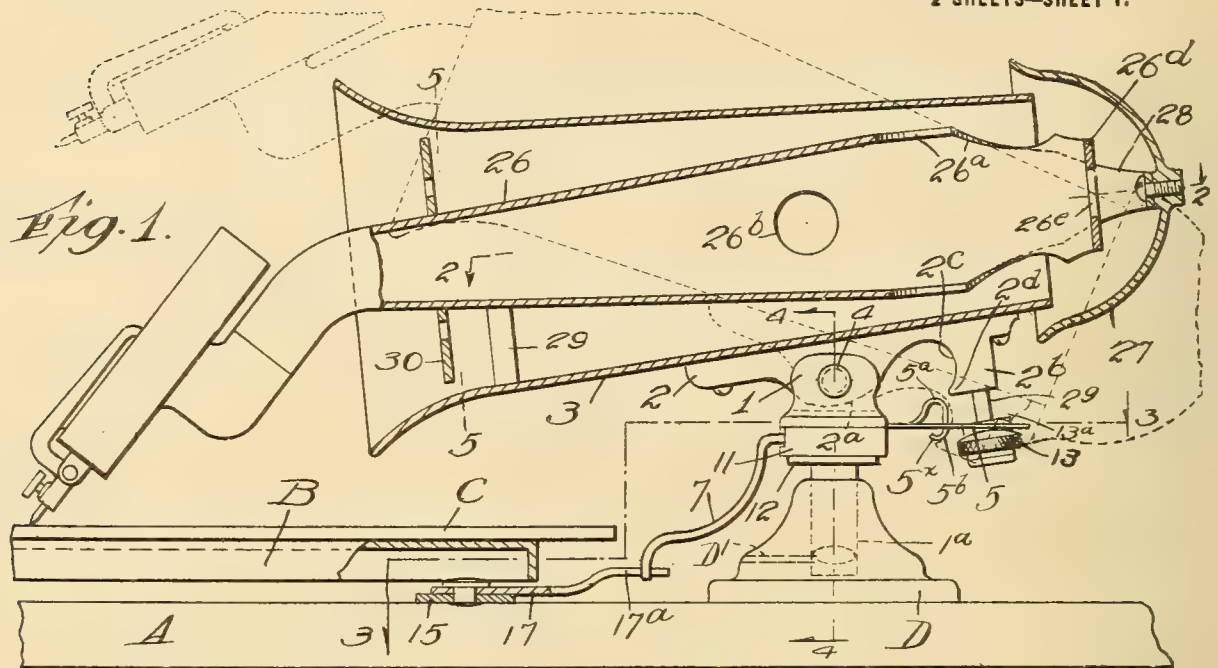


Fig. 5

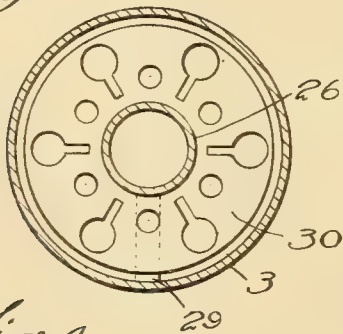


Fig. 4

Fig. 2

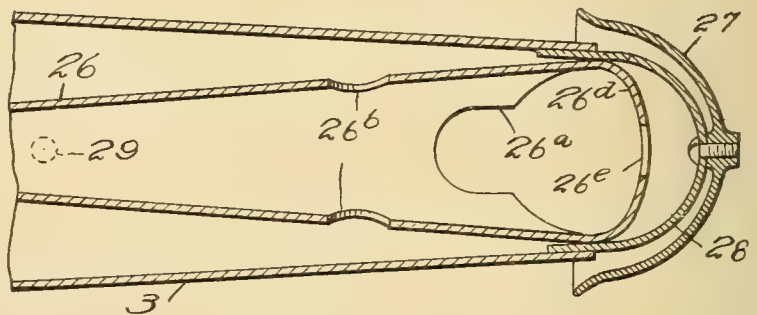
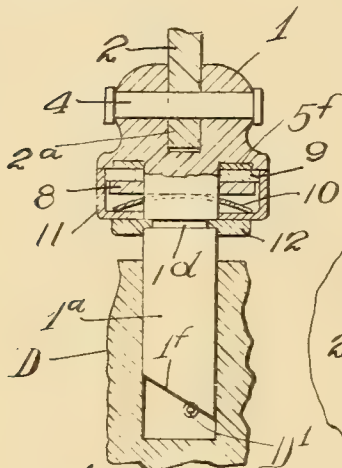


Fig. 3



Witness:
Oct. Hunter

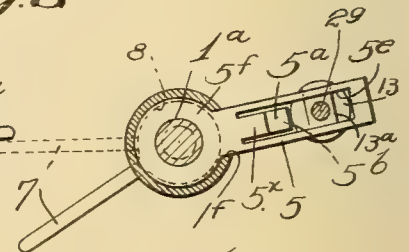
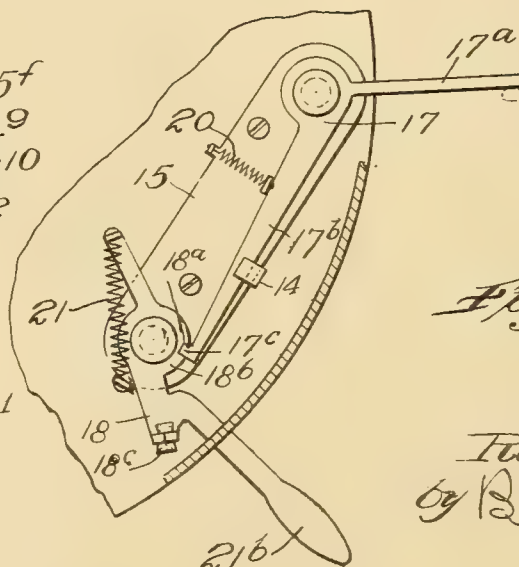


Fig. 6

Inventor:
 Reinhold Thomas:
 by Burton & Burton.
 his Attys.

R. THOMAS.
PHONOGRAPH.

APPLICATION FILED MAR. 15, 1917.

1,259,681.

Patented Mar. 19, 1918.
2 SHEETS—SHEET 2.

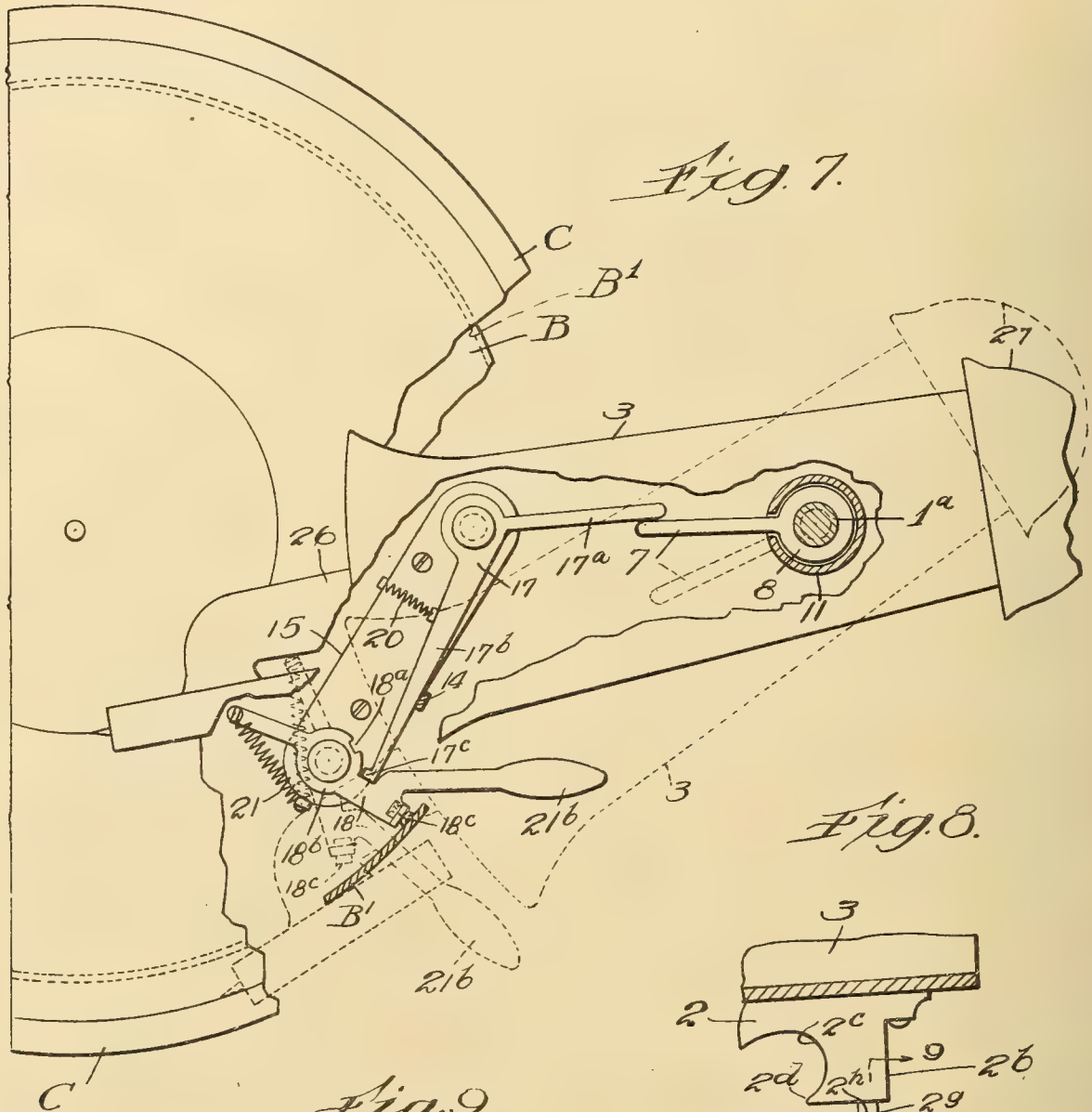


Fig. 7.

Fig. 9.

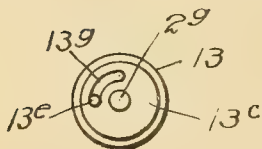


Fig. 10.

Witness:

Chas. H. Hunter

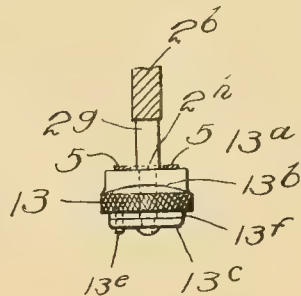
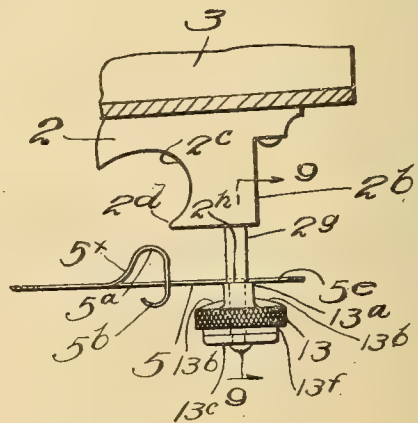


Fig. 8.



Inventor:
Reinhold Thomas

by *Burton Burton*

his Atty.

UNITED STATES PATENT OFFICE.

REINHOLD THOMAS, OF CHICAGO, ILLINOIS.

PHONOGRAPH.

1,259,681.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Application filed March 15, 1917. Serial No. 154,910.

To all whom it may concern:

Be it known that I, REINHOLD THOMAS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonographs, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved construction of phonograph of the type in which the tone arm and amplifier are associated together as a unitary structure, and mounted for swinging together over the record. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:—

Figure 1 is a vertical section axial with respect to the tone arm and amplifier of a structure embodying this invention.

Fig. 2 is a detail section at the line, 2—2, on Fig. 1.

Fig. 3 is a section at the line, 3—3, on Fig. 1.

Fig. 4 is a detail section at the line, 4—4, on Fig. 1.

Fig. 5 is a section at the line 5—5, on Fig. 1.

Fig. 6 is a detail plan view of a locking washer employed in the pivot joint.

Fig. 7 is a plan view with some parts broken away showing the parts at position for setting the tripping device preparatory to playing.

Fig. 8 is a detail side elevation, full size, of a check device for limiting the weight with which its stylus is pressed on the record.

Fig. 9 is a section at the line, 9—9, on Fig. 8.

Fig. 10 is a bottom plan view of the check device.

In the structure shown in the drawings A represents the table or top of the cabinet on which the phonograph is mounted. B is the record carrier which may be understood as mounted by means (not shown) for rotation about a vertical axis upon the cabinet top, A, and rotated by a motor, (not shown), also supported upon the cabinet

top below the same. C represents a record upon the record carrier. D is a block mounted upon the cabinet top, A, having a vertical socket to receive the spindle, 1^a, of a pivot support, 1, on which the unitary structure comprising the sound box, tone arm and amplifier is pivotally mounted for swinging to carry the sound box toward and from the record. Said unitary structure is pivoted to the pivot support, 1, by means of a bracket, 2, which is secured upon the lower side of the amplifier, 3, said bracket having a vertically-depending flange or lip, 2^b, which engages a vertical slot in the top of the bracket of the pivot support, 1, being secured therein by a pivot pin, 4. The bracket, 2, has at its rear end a downwardly-extending nose, 2^b, provided on its forward side with a recess, 2^c, for engaging a spring, 5, which is secured to the pivot support, 1, and adapted to fit said recess, said spring having rounded bends, 5^a and 5^b, to adapt the nose projection, 2^d, to be crowded around said bends for engaging and disengaging the spring as the entire device comprising the tone arm, amplifier and sound box is swung vertically about its pivot, carrying the sound box toward and from the record. The engagement of said nose terminal, 2^d, below the bend, 5^b,—that is with a spring engaged in the recess, 2^c,—serves to lock the device at the elevated position of the sound box away from the record and out of playing position;—(the position shown in dotted line in Fig. 1); and at the position shown in full line in said figure, with the nose terminal, 2^d, just above the upper bend, 5^a, of the spring, the sound box is in the lowered position for engagement of the stylus with the record, and the entire device is free to oscillate vertically to the limited extent necessary for the proper coöperation with the record. It will be understood that in the last mentioned or full-line position, the unitary structure comprising the sound-box, tone arm and amplifier is overbalanced at the sound-box-carrying end, so that it operates with adequate weight for pressing the stylus upon the record.

For the purpose of modulating the

weight with which the stylus is pressed upon the record to the point of greatest efficiency or best result, as that may be ascertained in each instrument, or according to the judgment of the inspector, there is provided a spring arm, 5, mounted fixedly with respect to the pivot support, 1, and projecting rearward in the path of the nose, 2^b, which carries a means of engaging under the spring for checking the upward movement of the rear end of the device, thus opposing the resiliency of the spring to the down-weight of the opposite end carrying the sound box.

As illustrated, and is convenient on construction, this spring, 5, is made in one piece with the spring catch, 5^x, the latter being struck up out of the former, as seen clearly in Fig. 3, leaving an aperture, 5^e, through which the nose, 2^a, extends for engaging the spring, 5^x, in the recess, 2^c, of the nose, as above described. This spring, 5, is made rigid with the pivot support, 1, by being made as a radial arm extending from an annular hub or collar, 5^f, which is lodged in a recess in the downwardly-facing shoulder of the head of the pivot support, 1, said radial arm extending out from the recess through a notch, 1^f, in the flange remaining of said shoulder around said recess, as seen in Fig. 3.

For carrying the check device to engage under the projecting spring, 5, a rigid stem, 2^g, is extended downwardly from the nose, 2^b, and reduced at 2^h, to form a shoulder below which there is mounted rotatably on said stem, a collar, 13, which at the upper side is cut away at two opposite segments, leaving a middle segmental rib, 13^a, projecting upward from the main body of the collar, the shoulders which are formed by said segmental rabbets being rounded as seen in Figs. 8 and 9 for bearing against the under side of the spring, 5, as seen in Fig. 1. The rib, 13^a, is adapted to pass through the aperture, 5^e, in the spring, 5, when the collar is turned on the stem to set the rib, 13^a, longitudinally coincident with the said aperture; but when the collar is turned 90 degrees from that position, said rib, 13^a, extends across the aperture, so that the top of the rib instead of the curved shoulder, 13^b, engages under the spring, 5. A disk, 13^c, is riveted onto the end of the stem, 2^g, forming a head for the same, above which a friction disk, 13^f, is interposed between said head and the lower side of the collar, 13, said parts being snugly held together and pressed up against the shoulder, 2^h, when the said disk, 13^c, is riveted in place, thus causing the collar to be frictionally held at either position to which it may be adjusted by turning about the stem. A pin, 13^e, is set into the lower side of the collar, 13, which is in the slot, 13^g,

which extends for 90 degrees in the head or washer, 13^e, thus limiting the adjustability of the collar, 13, to the necessary 90 degrees, permitting it to turn from the position at which the rib, 13^a, coincides with the aperture, 5^e, to the position at which said rib would stand across said aperture. When the instrument is provided with means for adjusting the sound box, or with a sound box having its stylus adjustable to adapt it to cooperate either with a record of the so-called hill-and-valley type, or with a record of the so-called zig-zag type of groove, it is desirable to have the pressure of the stylus upon the record regulable, so that it may be greater in the case of the hill-and-valley type of record than in the case of the zig-zag type, and this is accomplished by the adjustable collar, 13, cooperating with the apertured spring, 5, as above described; for it will be understood that the collar, 13, will be turned to the position to permit the rib, 13^a, to pass through the aperture, 5^e, of the spring, in playing with a hill-and-valley record and to the position at which the rib extends across the slot so as to be stopped below the spring when playing with a zig-zag record. The drawings do not show means for adapting the sound-box to cooperate with the two types of record, because this particular feature constitutes no part of the present invention, and any means for this purpose may be employed.

For the purpose of automatically terminating the rotation of the record and stopping the horizontal swinging movement of the tone-arm and sound box over the record at the conclusion of the playing, the following structure is provided:—A trip finger, 7, projecting as a lever arm from a hub or collar, 8, is mounted on the pivot support, 1, so as to be rotatable relatively thereto about the same vertical axis, and is frictionally engaged with said pivot support so as to be rotated therewith as well as to be capable of rotating relatively thereto. Devices for such frictional pivotal mounting comprise the said hub or collar, 8, centrally apertured so as to be passed onto and fit upon the spindle, 1^a, and pressed up toward the downwardly-facing shoulder of the head of the pivot support, 1, a fiber washer, 9, being preferably interposed between said hub, 8, and said shoulder of the head; a disk spring, 10, which is centrally apertured and passed onto the spindle, 1^a, up against the under side of the collar, 8; an inverted cup housing, 11, centrally apertured and passed onto the spindle, 1^a, up against the under side of the spring disk, 10, and with its flange inclosing said disk, the washer, 9, and the hub or collar, 8, except that said flange is notched at its upper edge to inter-engage said lever arm or trip finger, 7, which extends off from said hub

or collar, 8, out through said notch. All the above-mentioned parts are held in place, pressed up toward the shoulder of the head of the pivot support, 1, by means of a locking washer, 12, which has a radial notch, 12^a, leading into its central aperture which is dimensioned for engaging the inner circumference in an annular groove, 1^d, formed in the spindle, 1^a, so that when said washer is passed into place in said groove, as seen in Fig. 4, the said parts are held in place and the spring disk, 10, is compressed to proper tension for producing adequate frictional engagement of the hub or collar, 8, with the pivot support, 1, for the purpose hereinafter explained. The locking washer, 12, is preferably provided on its lower face with a recess, 12^b, around the central aperture, said recess having the unreduced diameter of the spindle, 1^a, of the pivot support, 1, so that the reaction of the spring, 10, locks the locking washer in position on the spindle, 1^a. Upon the upper side of the cabinet top, A, there is mounted a plate, 15, upon which there is pivoted at 16 a trigger, 17, having a finger, 17^a, which extends out past the margin of the record support under the same so as to project in the path of the trip finger, 7, as the latter swings with the pivot support, 1, about the vertical axis of the latter. The trigger, 17, has a locking arm, 17^b, provided with a locking tooth, 17^c, which engages a notch, 18^a, in a flange, 18^b which projects from the pivot bearing of a brake device, 18, which is pivotally mounted on said plate, 15, and adapted to swing thereabout to engage its brake terminal, 18^c, with a depending flange, B¹, of the record carrier, B. A spring, 20, reacting on the lever arm, 17^b, of the trigger tends to press the tooth, 17^c, against the edge of the flange, 18^b, ready to engage the notch, 18^a, and said notch is positioned relatively to the brake terminal 18^c, for engagement with said tooth when the brake terminal is pressed against the flange, B¹, for holding the record carrier at rest. A spring, 21, reacting upon the brake member, 18, operates to swing the brake terminal against the flange to engage the record carrier. The brake member has an operating handle, 21^b, which projects beyond the margin of the record carrier for manipulation of the brake by the operator. The mode of use and operation of the brake and trip device described is as follows: When a record is placed upon the record carrier for playing, the sound box is swung over to a position at which the stylus is at the innermost or final course of the final groove of the record,—that is, at the point at which the playing will be ended, and while it is in this position, the trip finger, 7, is turned about the spindle, 1^a, of the pivot support, 1, until the end of the finger is in contact with the

trigger, 17^a,—the brake, of course, being at position for holding the record carrier at rest. The sound box being now swung to carry the stylus to the position for commencing the playing, the brake will be released by swinging the brake handle, 21, to the dotted line position, Fig. 7, at which it will be locked by the engagement of the tooth, 17^c and the notch, 18^a. As the playing proceeds to the end, the trip finger, 7, will be carried into contact with the trigger, 17^a, and the frictional engagement of said trip finger with the pivot support, 1, is sufficient to turn the trigger about its pivot disengaging the tooth, 17^c from the notch, 18^a, and releasing the brake whose spring, 21, will immediately swing it into engagement with the flange, B¹, of the record carrier, and halt the rotation of the latter.

The unitary structure comprising the sound box, tone arm and amplifier which is mounted for swinging over the record together, is characterized by the following features requiring some description. The tone arm is tapered from the smaller end at which the sound box is connected, widening toward the opposite end which extends within the amplifier, 3, said amplifier being also tapered widening from the end adjacent to the wider end of the tone arm back toward the smaller end of the tone arm, encompassing the latter, being additionally flared at the discharge end around the conduit back of the sound box. The wider end of the tone arm and the end of the amplifier are only slightly different in diameter, so that only a small annular space would remain around the larger end of the tone arm inside the amplifier, but for the fact that said larger end of the tone arm is provided with oppositely positioned wide and deep notches, 26^a, affording free communication for the vibrations of air in the tone arm to be communicated to the air in the amplifier outside of the tone arm. Additional apertures, 26^b, may be provided in the tone arm for further transmission of the vibrations from the tone arm to the amplifier. The mouth of the tone arm, 26, at its wider end within the narrower end of the amplifier is bridged by a curved bar, 26^d, extending in a diametric zone, preferably concaved, as shown, toward the smaller end of the tone arm, and provided with a central aperture, 26^e, thus partly reflecting and partly transmitting the vibrations. Encompassing and facing concavely toward the larger end of the tone arm and the encompassing smaller end of the amplifier and extending outside the latter, there is an approximately hemispherical reflector, 27, which is supported in the position stated, co-axial with the tone arm and amplifier, by a bow, 28, whose ends are secured to the amplifier, and to its middle part the reflector is secured at its cen-

ter. The bow, 28, at its end serves to space the tone arm from the encompassing mouth of the amplifier without materially obstructing the annular gap between them.

5 The tone arm is otherwise held and positioned co-axially within the amplifier solely by a sound post, 29, which extends from the amplifier to the tone arm at the lower side of the latter near the discharge mouth of the amplifier, but preferably a little back
10 of the flaring portion of the latter. For modulating the sound and cutting off minor and interferant vibration, there is provided a multiple-apertured disk, 30,
15 mounted upon the tone arm near the commencement of the flaring portion of the amplifier forward of the sound post. This disk is supported only on the tone arm, and although its circumference is near to the
20 inner surface of the amplifier, it is without contact therewith.

The combined effect of the mounting of the tone arm within the amplifier as described, with support thereon substantially
25 only by the sound post, and with communication therewith as described through the adjacent larger end of the tone-arm and smaller end of the amplifier, and the provision of the reflector embracing said adjacent ends for reflecting a portion of the vibrations back outside the amplifier toward the sound box, and a portion back through the amplifier, and of the multiple-apertured
30 modulating disk, 30, is to cause the delivery of the sound in clear bell-like tones with the minimum of accidental or over-tones.

I claim:—

1. In a phonograph in combination with a sound conduit and a sound box carried
40 thereon, a pivot support pivotally mounted for turning about a vertical axis, the sound conduit being pivoted to said support for swinging toward and from the record; a catch nose rigid with the sound conduit and
45 a spring carried by the pivot support for yieldingly engaging the catch nose when the sound conduit is swung in the direction for carrying the sound box away from the record.

50 2. In a phonograph, in combination with a tone arm adapted for mounting of the sound box at one end, an amplifier or horn within which the tone arm extends, having its discharge end opening in the direction of
55 the end of the tone arm at which the sound box is carried; means for positioning the tone arm within the amplifier comprising a sound-post near the discharge end of the amplifier, the tone arm being at that end
60 otherwise unattached to the amplifier.

3. In a phonograph, in combination with a tone arm adapted for mounting of the sound box at one end, an amplifier or horn within which the tone arm extends, having

its discharge end opening in the direction of
65 the end of the tone arm at which the sound box is carried; means for positioning the tone arm within the amplifier, and a multiple-apertured disk mounted on the tone arm and positioned in the mouth of the am-
70 plifier out of contact with the latter.

4. In a phonograph, in combination with a tone arm adapted for mounting of the sound box at one end, an amplifier or horn
75 within which the tone arm extends, having its discharge end opening in the direction of the end of the tone arm at which the sound box is carried; means for positioning the tone arm within the amplifier comprising a
80 sound-post near the discharge end of the amplifier, the tone arm being at that end otherwise unattached to the amplifier, and a multiple-apertured disk mounted on the tone arm and positioned in the mouth of the am-
85 plifier out of contact with the latter.

5. In a phonograph, in combination, a tapering tone arm and a sound box carried at the smaller end thereof; a tapering amplifier encompassing the tone arm from the
90 larger end of the latter toward the smaller end, the larger end of the tone arm being only slightly less in diameter than the smaller end of the amplifier adjacent thereto, and said larger end of the tone arm having
95 deeply-extended notches affording lateral communication from the tone arm to the amplifier, and having a bridge-piece extending diametrically across its open wider end between said notches, said bridge-piece hav-
100 ing an aperture axial with respect to the tone arm, and a reflector fixed with respect to the tone arm and amplifier having its mouth encompassing the adjacent ends of the tone arm and amplifier.

6. In a phonograph, in combination with
105 the sound box and sound conduit by which it is carried, pivoted for moving the sound box toward and from the record; a check device carried by the sound conduit, and a spring on the pivot support positioned for
110 encounter of the check device in the downward-swinging movement of the sound-box toward the record, said check device comprising a part which makes the encounter with the spring provided with two shoulders
115 for such encounter, and movable to position either of said shoulders at will for encounter with the spring.

7. In a phonograph in combination with a sound box, and a sound conduit by which
120 it is carried, pivoted for moving the sound box toward and from the record; a pivot support for the sound conduit on which the latter is over-balanced downward at the sound-box carrying end; a check device car-
125 ried by the sound conduit behind the pivot; a spring carried by the pivot support for encounter with said check device, the check

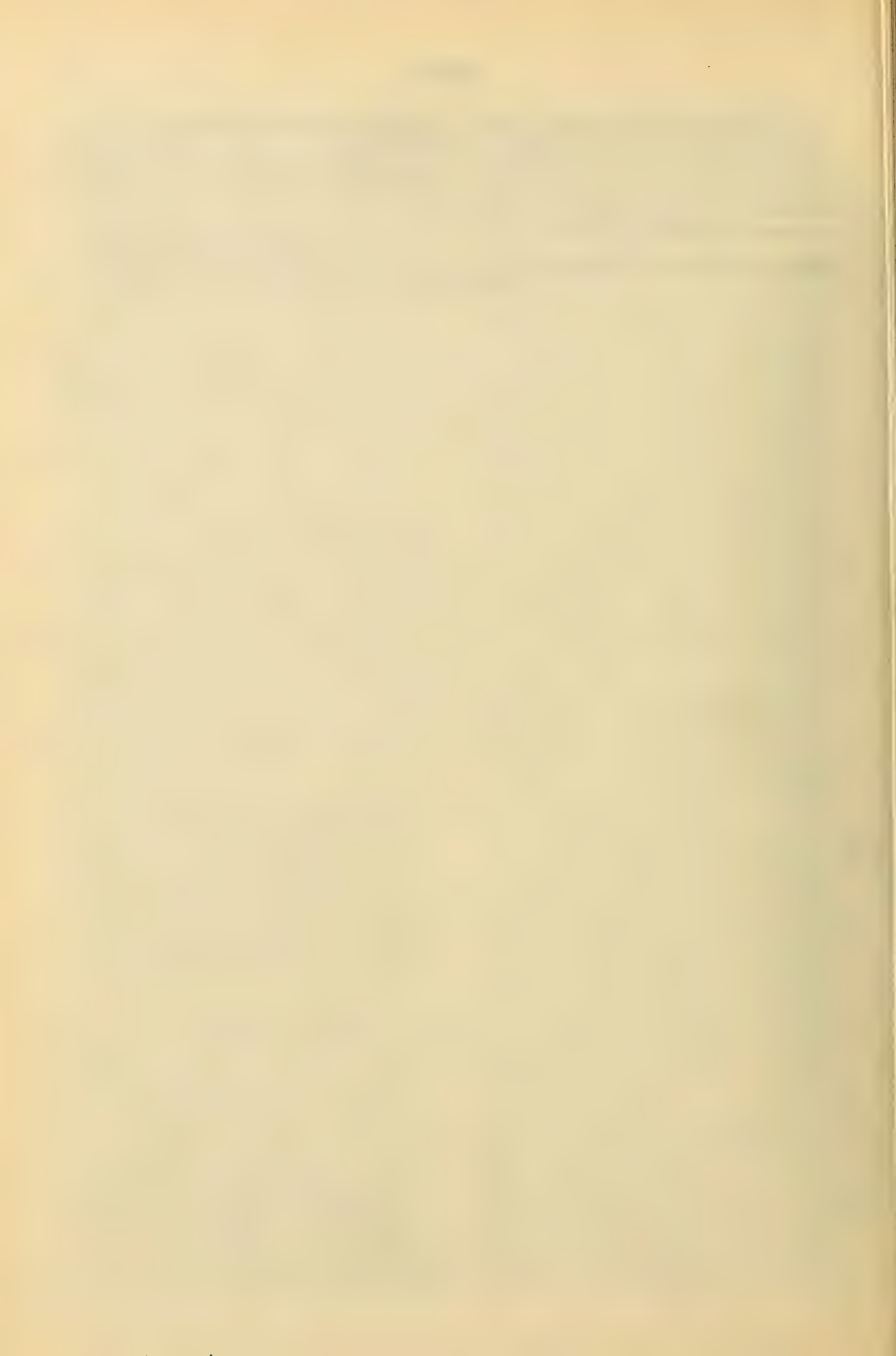
device comprising a stem which extends from the sound conduit past the spring, and a member carried by said stem below the spring, provided with two shoulders vertically spaced apart from each other, said shouldered part being rotatable on the stem to cause one shoulder or the other to be posi-

tioned for encounter with the under side of the spring.

In testimony whereof, I have hereunto set my hand at Chicago, this 14th day of February, 1917.

REINHOLD THOMAS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



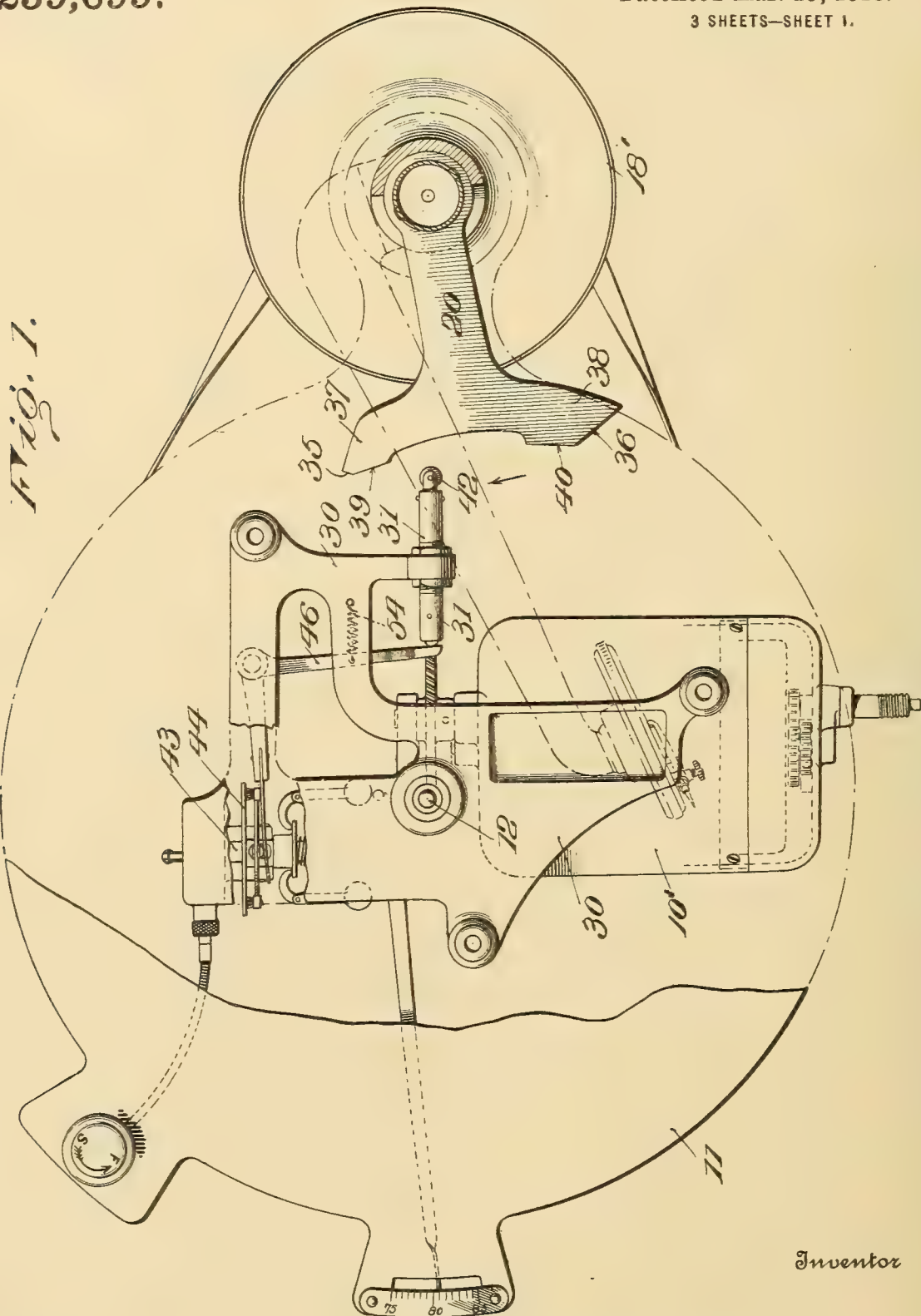
START AND STOP MECHANISM FOR TALKING MACHINES.

1,259,699 ----- C. E. Woods,
Filed Sept. 9, 1913,
Patented Mar. 19, 1918.

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 APPLICATION FILED SEPT. 9, 1913.

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 3 SHEETS—SHEET 1.



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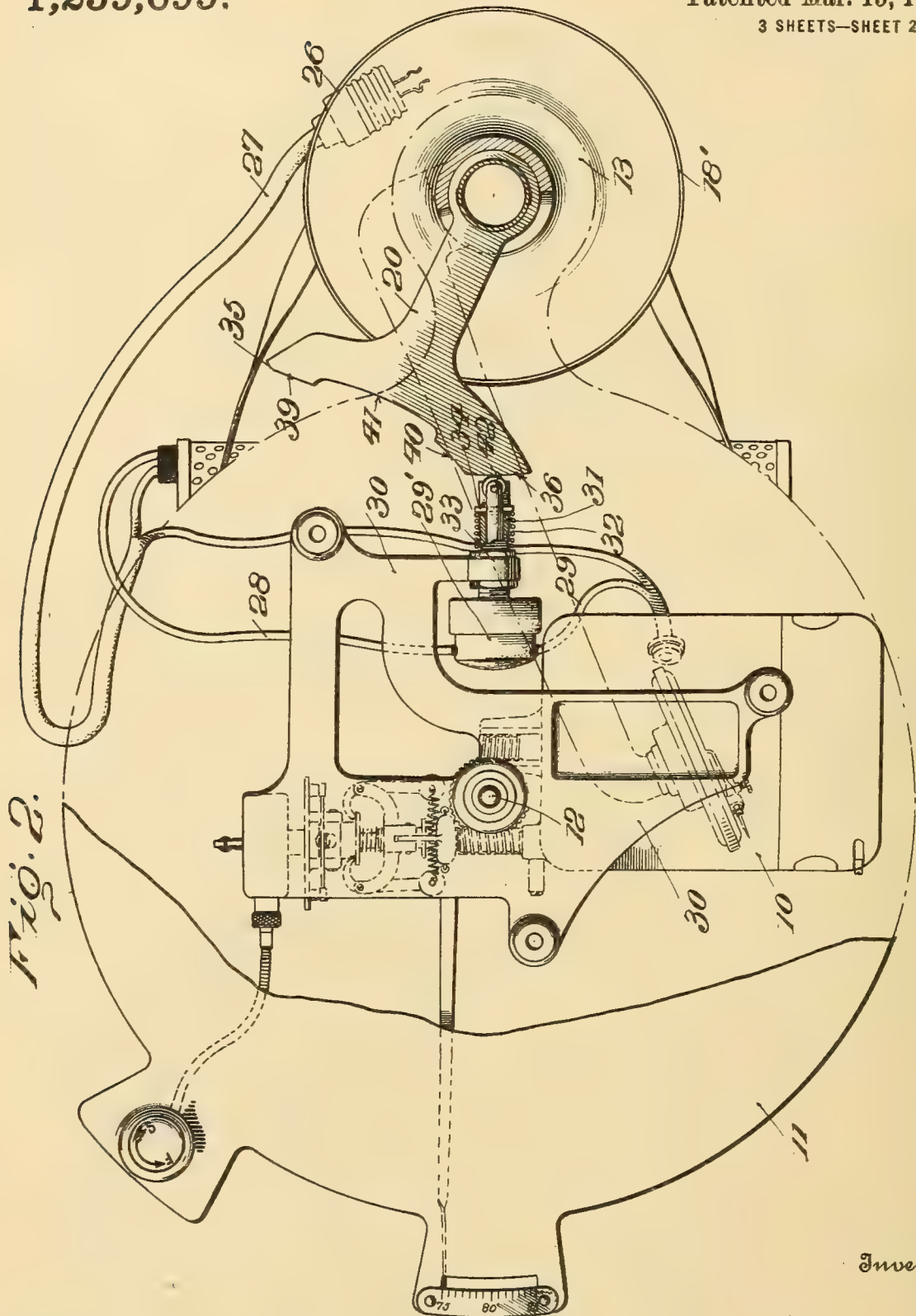


Fig. 2.

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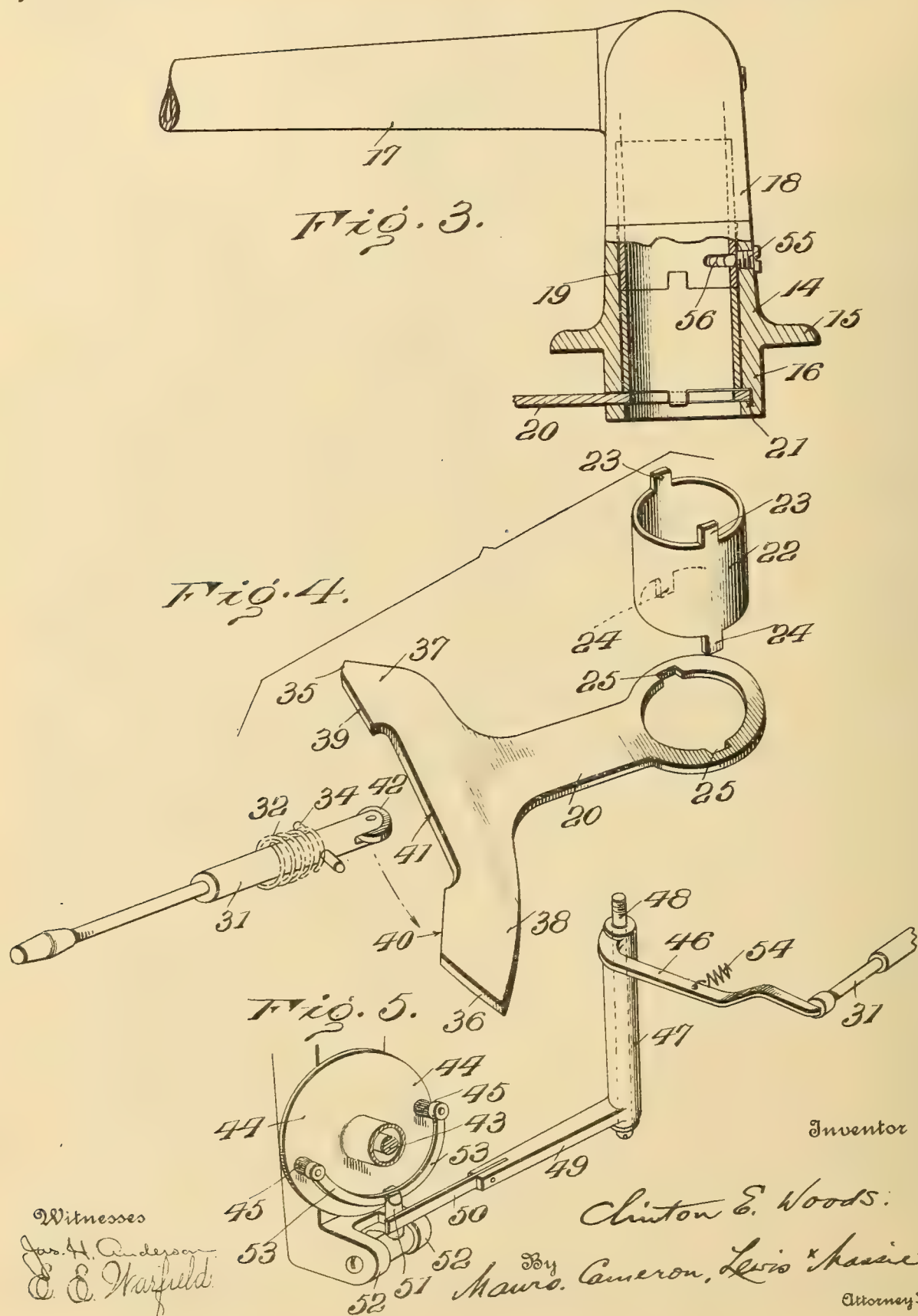
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START AND STOP MECHANISM FOR TALKING-MACHINES.

1,259,699.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Application filed September 9, 1913. Serial No. 788,826.

To all whom it may concern:

Be it known that I, CLINTON E. WOODS, of Bridgeport, Connecticut, have invented a new and useful Improvement in Start and Stop Mechanism for Talking-Machines, which invention is fully set forth in the following specification.

This invention relates to start-and-stop mechanism especially designed for but not necessarily restricted to talking machines. In providing start-and-stop mechanism for talking machines, a variety of possible conditions have to be taken into consideration. The motor may be a continuously running motor, capable of being connected to, or disconnected from, the talking machine for starting and stopping the same; or, a motor such as an electric motor may be in constant operative relation with the machine, and the current to the motor be switched on and off to start and stop the motor; or a spring-actuated motor may be in constant operative relation with the machine, and a sufficient resistance introduced at a suitable point in the mechanism to overcome the motor and stop the machine, which resistance being removed, permits the motor to start the machine. The object of the present invention is to provide means whereby the talking machine shall normally be held stopped when the reproducer is out of operative relation with the record-groove; whereby the talking machine shall be automatically started when the reproducer is placed in operative relation with the record-groove, and whereby the talking machine shall continue to operate so long as the reproducer remains in operative relation with the record, but shall be stopped when the tone-arm, with its accompanying reproducer, is shifted to inoperative position, whether it be at the center or at the periphery of the record. A further object is to provide a simple and efficient device for accomplishing the results indicated above.

With this object in view, the invention consists, as in a talking machine, of start-and-stop mechanism therefor, a movable element or tone-arm, and means, as a cam, moving with said movable element or tone-

arm and positively actuating said start-and-stop mechanism. Preferably, there is an arm connected with the movable element or tone-arm provided with two suitably spaced cams, either one of which is capable of being positioned to actuate the start-and-stop mechanism, one being effective when the tone-arm is at the outer periphery of the record, and the other when the tone-arm is in position with the reproducer adjacent the center of the record tablet.

Generally speaking, when the tone-arm with its reproducer is outside of the periphery of the record, a cam controlled by the tone-arm is in position to maintain the start-and-stop mechanism in position to prevent the operation of the machine. When the tone-arm with its reproducer is moved into position to commence the reproduction of a record, the mechanism is automatically released, and the machine started, and it continues in operation until the tone-arm is moved to a point (either at the center or the periphery of the record) where one of the cams again engages the start-and-stop mechanism. In case the record is of sufficient length, the parts may be and sometimes are, so constructed that the record itself will advance the tone-arm sufficiently near the center of the record-tablet to actuate the start-and-stop mechanism to stop the machine. Otherwise, the stopping action is effected by manually moving the tone-arm to the proper position.

The inventive idea involved is capable of receiving a variety of mechanical expressions, two of which, for the purpose of illustrating the invention, are shown in the accompanying drawings, one showing the application of the inventive idea to a structure embodying an electrical motor, and the other to a structure embodying a spring motor; but it is to be expressly understood that such drawings are for the purpose of illustration only, and are not designed to define the limits of the invention, reference being had to the appended claims for this purpose.

In said drawings. -

Figure 1 is a top plan view, showing the

start - and - stop mechanism constituting the present invention, operating in association with a spring motor;

Fig. 2 is a similar view, showing the start-and-stop mechanism operating in association with an electric motor;

Fig. 3 is a side elevation, partly in section (some of the parts being broken away for the sake of clearness), showing the tone-arm, its mounting on a hollow support, and the connection between said tone-arm and the start-and-stop mechanism; and

Figs. 4 and 5 are detail views.

Referring to the drawings, wherein like reference numerals indicate like parts, 10 is any suitable motor, whether spring or electric, secured in any usual or desired manner to the underside of a motor board 11. Said motor drives a vertical shaft 12, which passes through the motor board 11 and on which is mounted the usual turn table or record support (not shown). The motor board 11 is provided with a perforated ear 13, preferably formed integrally therewith, on which ear is mounted a hollow support 14 for the tone-arm. This support is provided with a flange 15 which rests on the ear, and an extension 16 that passes through the perforation in the ear in snug engagement therewith.

The tone-arm is preferably composed of a horizontal section 17 (to which the usual or any suitable sound-box is secured) and a vertical section 18, which, as here shown, is associated with a sound-deflector 18', though any suitable amplifying horn may be employed. Within the vertical section 18 is preferably secured, to turn therewith, a sleeve 19 which projects down into the hollow support 14 and is connected in any suitable manner to an arm 20 which is rotatable in a recess 21 in said hollow support 14. As here shown, the connection is effected through the intermediary of an annular member 22, provided at its upper end with a plurality of lugs 23 which engage in corresponding recesses in sleeve 19, and at its lower end with lugs 24 which engage corresponding recesses 25 in arm 20. By this, or any other suitable connection between the tone-arm and said lever, the movements of the former are transmitted to the latter, so that as the tone-arm is propelled across the record the arm 20 will be moved through the same angular distance. The starting and stopping of the motor are controlled by the movements of the tone-arm operating through said arm 20, the latter acting to effectively perform this function, whether it is associated with an electrical motor 10, as indicated in Fig. 2, or with a spring motor 10', as indicated in Fig. 1.

Referring particularly to Figs. 2 and 4, 26 is the usual electric plug connected to

conductor 27 which conveys current to the electric motor 10, and 28 and 29 are conductors that lead to a suitable switch mechanism (not shown) contained in casing 29' carried by casting 30 which is secured to the motor board in any suitable manner. The circuit to the motor is opened and closed at said switch by a movable element or terminal 31, which is operated from the arm 20, and which has bearing in an extension of said casting 30. When the parts are in the position shown in Fig. 2, the terminal 31 has been moved inward to open the circuit, and when the terminal occupies the position shown in Fig. 4, the circuit through the motor is closed. The terminal is moved inward (in the present instance to open the circuit) against the tension of coiled spring 32, which reacts between a nut 33 and a pin 34 passing through the terminal; and is moved in the opposite direction by said spring 32.

The particular form of means herein shown for operating said movable element or terminal 31 consists of two cam surfaces 35 and 36 formed on extensions 37 and 38 of said arm 20, incline 39 being associated with cam surface 35 and incline 40 with cam surface 36. Between these inclines is provided a cut-out portion 41. When either cam surface 35 or 36 engages the end of the movable member or terminal 31, which latter is preferably provided with an anti-frictional roller 42, said element is moved to open the switch and stop the motor. When said roller 42 engages incline 39 or 40, said movable element is moved by spring 32 to close the switch and start the motor, and the motor continues to run while the cut-out portion 41 passes the movable member, as shown in Fig. 4. The function of inclines 39 and 40 is to control the compression and expansion of spring 32, so that its action will be gradual, and the motor will be started and stopped without violence or jarring, though none the less quickly and effectively.

Referring particularly to Figs. 1 and 5, the present invention is shown as applied to a talking machine which is operated by a spring motor 10'. The governor shaft is indicated by 43, and 44 is a friction disk keyed to said shaft. In this embodiment of the inventive idea, the movement of element 31 operates, by any suitable means, to press friction pads 45 against the friction disk with sufficient force to stop the motor. The particular means here shown consist of a crank 46, one end of which engages the movable element 31, and the other end of which is securely fixed to the upper extremity of a sleeve 47 rotatable on a pin 48 secured in casting 30, the lower extremity of said sleeve carrying an arm 49 to the free end of which is secured a resilient member 50. This mem-

ber bears against a lever 51 pivoted in brackets 52—52, said lever carrying a friction-pad-supporting member 53 to which are secured a plurality of friction pads 45 which, as heretofore stated, are pressed against friction disk 44 to stop the motor. The pads 45 are moved against the tension of spring 54 (Fig. 1) into engagement with disk 44 to stop the motor. One end of said spring is secured to crank 46 and the other end is anchored to casting 30, said spring acting to remove the pads from the friction disk when the cam surfaces 35 and 36 are disengaged from roller 42.

The horizontal movement of the tone-arm is limited in any suitable manner; as here shown (Fig. 3), the end of a screw 55, carried by the hollow support 14, engages in a slot 56 in sleeve 19 carried by the vertical section 18 of the tone-arm.

The operation of the device is as follows:—

If the sound record is of sufficient length so that, when the reproduction is completed, the tone-arm shall have moved the arm until the cam surface 36 has engaged the roller 42, the motor will be automatically stopped. On the other hand, if the record is a shorter one, so that the tone-arm does not move far enough to engage the cam surface 36 with roller 42, the motor may be stopped by manually moving the tone-arm the necessary additional distance to engage surface 36 with roller 42. At this time, the tone-arm and the sound-box occupy the position shown in dotted lines in Fig. 2, that is to say, the sound-box is adjacent the center of the record tablet. The motor is also stopped when cam surface 35 engages roller 42 and actuates movable member 31. This engagement is effected by swinging the tone-arm in the opposite direction to that in which it is propelled by the sound-record, and until the pin 55 engages the end of slot 56. At this time the sound-box is clear of the record, and when it is desired to start the motor, the operator moves the sound-box and tone-arm inward until the stylus engages the commencement of the record, at which time the roller 42 has passed off of cam surface 35 and onto incline 39, thus permitting spring 54 (Fig. 1) or spring 32 (Fig. 2) to displace movable member 31 to close the circuit of the electric motor 10 or to withdraw from disk 44 the friction pads 45 associated with the spring motor 10'. When the roller 42 reaches the inner end of incline 39, the movable member 31 has reached the limit of its movement toward the right (Fig. 1), and said member continues in this position until incline 40 engages roller 42, when member 31 is gradually forced toward the left against the tension of its associated spring. When

cam surface 36, either manually or automatically, engages roller 42, as heretofore stated, the movable element 31 will have reached the extremity of its movement toward the left, to the end that the circuit of the electric motor is opened or the friction pads 45 are pressed into stopping engagement with friction disk 44.

While for the purpose of clearness, two embodiments of the inventive idea have been herein described and illustrated in detail, it is to be understood that the inventive idea is not limited to the structures shown, but that it is susceptible of various embodiments conforming to the definition of the invention given in the claims which follow.

What is claimed is:—

1. In combination, a rotating element, a movable element traversing said rotating element and means moved by said movable element and including a plurality of spaced cams for positively stopping the movement of said rotating element.

2. In combination, a rotating element, a movable element traversing said rotating element, and means connected to said movable element and moving therewith for positively stopping the movement of said rotating element, said means including a plurality of spaced cams.

3. In combination, a rotating element, a pivoted element adapted to swing across said rotating element, a movable member associated with and controlling the movement of said rotating element, and means actuated by said pivoted element for positively moving said member, said means including a plurality of spaced cams.

4. In combination, a rotating element, a pivoted element adapted to swing across said rotating element, a movable member associated with and controlling the movement of said rotating element, and means moved by said pivoted element and positively moving said member, said means including a plurality of spaced cams.

5. In combination, a motor, a record support driven thereby, sound-reproducing means associated therewith, a movable member associated with and controlling the operation of said motor, and means including a plurality of cam surfaces moving with said sound-reproducing means and positively moving said member to stop said motor mechanism.

6. In a talking machine, a motor, a record support driven thereby, a swinging tone arm, a movable member associated with and controlling the operation of said motor, and means moved by said tone-arm and positively operating said movable member to stop the motor, said means including a plurality of spaced cam surfaces.

7. In a talking machine, a motor, a swing

ing-arm, a movable member associated with and controlling the operation of said motor, and means positively operating said movable member including a plurality of spaced cam surfaces connected to and movable with said swinging arm.

8. In a talking machine, a motor, a swinging-arm, a reciprocatory member associated with and controlling the operation of said motor, and means positively operating said reciprocatory member including a plurality of spaced cam surfaces connected to and movable with said swinging-arm.

9. In a talking machine, a motor, a swinging-arm, means for stopping the motor including a movable member, and means positively actuating said movable member including a plurality of spaced cam surfaces connected to and moving coaxially with said swinging-arm.

10. In a talking machine, a motor, a swinging-arm, means controlling the operation of the motor including a movable member, a cam surface connected with the swinging-arm and positively displacing said movable member to stop the motor, and a second cam surface connected with the swinging-arm and also adapted to engage said member to stop the motor, said cam surfaces being spaced.

11. In a talking machine, a motor, a swinging-arm, means controlling the operation of the motor including a movable member, and a plurality of spaced cam surfaces adapted to positively displace said movable member, one being automatically moved into engagement with said movable member to stop the motor and the other being moved into such engagement by the manual movement of the swinging-arm.

12. In a talking machine, a motor, a swinging-arm, means controlling the operation of the motor including a movable member, and a plurality of spaced cam surfaces connected with the swinging-arm and moved thereby adapted to positively displace said movable member, one being automatically moved into engagement with said movable member to stop the motor and the other being moved into such engagement by the manual movement of the swinging-arm.

13. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable member, a swinging-arm, an arm connected thereto and movable therewith, and two spaced cam surfaces provided on said arm for engaging and positively actuating said movable member to stop the motor.

14. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable member, a swinging-arm, an arm connected thereto and movable therewith, and two spaced cam surfaces provided on said arm, one being automati-

cally moved into engagement with said movable member to positively displace the same and stop the motor and the other being moved into such engagement by the manual movement of the swinging-arm.

15. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable member, a swinging-arm, a sleeve connected thereto and movable therewith, an arm connected to said sleeve, and two spaced cam surfaces provided on said arm for engaging and positively actuating said movable member to stop the motor.

16. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable member, a swinging-arm, a sleeve connected thereto and movable therewith, an arm connected to said sleeve, and two spaced cam surfaces provided on said arm, one being automatically moved into engagement with said movable member to positively displace the same and stop the motor and the other being moved into such engagement by the manual movement of the swinging-arm.

17. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable spring-pressed member, a swinging-arm, a sleeve connected to and movable therewith, an arm connected to said sleeve, and two spaced cam surfaces provided on said arm for engaging and positively actuating said movable member to stop the motor.

18. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable spring-pressed member, a swinging-arm, a sleeve connected to and movable therewith, an arm connected to said sleeve, and two spaced cam surfaces provided on said arm one being automatically moved into engagement with said movable member to positively displace the same and stop the motor and the other being moved into such engagement by the manual movement of the swinging-arm.

19. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable spring-pressed member, a swinging-arm, a sleeve connected to and movable therewith, an arm connected to said sleeve, and two spaced cam surfaces provided on said arm one being moved into engagement with said movable member to positively displace the same and stop the motor by manual movement of the swinging-arm.

20. In a talking machine, a motor, means controlling the starting and stopping of the same including a movable member, a swinging-arm, a plurality of spaced cam surfaces connected to and movable with said swinging-arm, one of said cam surfaces being moved into engagement with said movable member

to positively displace the same and stop the motor by manual movement of the swinging-arm.

21. In a talking machine, a swinging-arm, 5 an arm connected thereto, a plurality of spaced cam surfaces provided on said arm, and a start-and-stop mechanism positively actuated by said cam surfaces, said start-and-stop mechanism being out of contact 10 with the cam surfaces while the swinging-arm is propelled by the record-groove.

22. In combination, a rotary record support, a tone-arm associated therewith, and stop mechanism comprising means connected 15 with said tone-arm for positively stopping said record support, said stop mechanism comprising spaced means becoming effective at spaced points in the range of movement of said tone-arm.

23. In combination, a rotary record support, a tone-arm associated therewith and having a limited range of movement, and stop mechanism comprising means connected 20 with said tone-arm for positively stopping said record support adjacent either extremity of the range of movement of said tone-arm.

24. In combination, a rotating element, a movable element associated therewith, a 30 movable member controlling the movement of said rotating element, and means moved by said movable element for positively actuating said member at spaced points in the range of movement of said movable element.

25. In combination, a rotating element, a movable element associated therewith and having a limited range of movement, a movable member controlling the movement of 35 said rotating element, and means moved by said movable element for positively actuating said member adjacent either extremity of the range of movement of said movable element.

26. In combination, a rotating element, 45 a swinging arm associated therewith, a movable member controlling the movement of said rotating element, and an arm moving with said swinging arm and positively actuating said member adjacent either extremity 50 of the range of movement of said swinging arm.

27. In combination, a rotating element, a traveling element, a movable member controlling the movement of said rotating element, and means moving with said traveling 55 element positively and automatically actuating said member when moved in one direction by said traveling element and positively actuating said member when moved in the 60 opposite direction by the manual movement of said traveling element.

28. In combination, a rotating element, a traveling arm propelled thereby, a movable member controlling the movement of said 65 rotating element, and an arm moved by said

traveling arm to actuate positively and automatically said member when propelled in one direction by said rotating element and to actuate positively said member when moved in the opposite direction by manual 70 movement of said traveling arm.

29. In combination, a motor, a swinging arm, a movable member controlling the starting and stopping of said motor, and means moving with said arm and positively actuating 75 said member to stop the motor upon said arm being moved to initial inoperative position.

30. In combination, a rotating element, a traveling element propelled across said 80 rotating element in one direction, a member controlling the movement of said rotating element, and means moved by said traveling element and positively actuating said member upon movement of said traveling ele- 85 ment in the opposite direction to initial inoperative position.

31. In combination with a rotary record support and a tone-arm associated therewith, of stop mechanism, and means connected with and moved by said tone-arm and positively actuating said stop mechanism 90 when the tone-arm is restored to initial inoperative position.

32. In combination with a rotary record 95 support and a tone-arm associated therewith, of stop mechanism, and means connected with and moved by said tone-arm and positively actuating said stop mechanism adjacent either extremity of the range 100 of movement of said tone-arm.

33. The combination with a motor, a motor-driven rotating element, and a traveling element normally propelled by the rotating element, of mechanism serving to auto- 105 matically admit power to the motor upon the movement of the traveling element inward from a position outside the periphery of the rotating element.

34. The combination with a motor, a 110 motor-driven rotating element and a traveling element normally propelled by the rotating element, of mechanism serving to automatically admit power to the motor upon 115 movement of the traveling element to operative position adjacent the periphery of the rotating element.

35. In a talking machine, the combination of a motor, a record support driven thereby, sound-reproducing means mounted to co- 120 operate with a record on said support, and means to automatically admit power to said motor upon movement of said sound-reproducing means into coöperative relation with the record on said support. 125

36. In a talking machine, the combination of a motor, a record support driven thereby, sound-reproducing means mounted to co- operate with a record on said support, and means to start said motor upon movement of 130

said sound-reproducing means inward to initial operative position.

37. In a talking machine, the combination of a motor, a record support driven thereby, 5 sound-reproducing means mounted to co-operate with a record on said support, stop mechanism, and means to positively actuate said stop mechanism to stop said motor upon movement of said sound-reproducing means 10 to initial inoperative position.

38. In a talking machine, the combination of a motor, a record support driven thereby, sound-reproducing means mounted to co-

operate with a record on said support, stop mechanism, and means operatively connected with said sound-reproducing means to positively actuate said stop mechanism to stop said motor at spaced points in the travel of said sound-reproducing means.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CLINTON E. WOODS.

Witnesses:

JOHN R. PETRIE,
JOHN A. GRIFFITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND BOX FOR PHONOGRAPHS.

1,259,815 ----- J. B. Westenhaver,
Filed June 15, 1917,
Patented Mar. 19, 1918.

J. B. WESTENHAVER.
SOUND BOX FOR PHONOGRAPHS.
APPLICATION FILED JUNE 15, 1917.

1,259,815.

Patented Mar. 19, 1918.

Fig. 1.

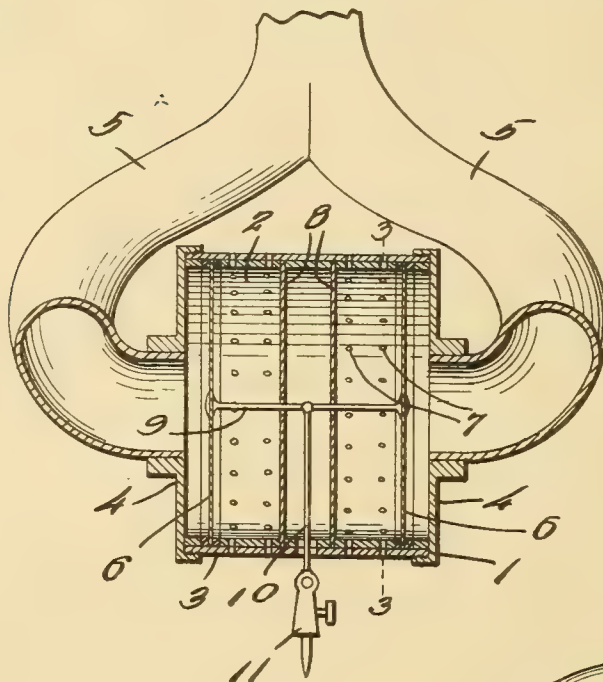


Fig. 2.

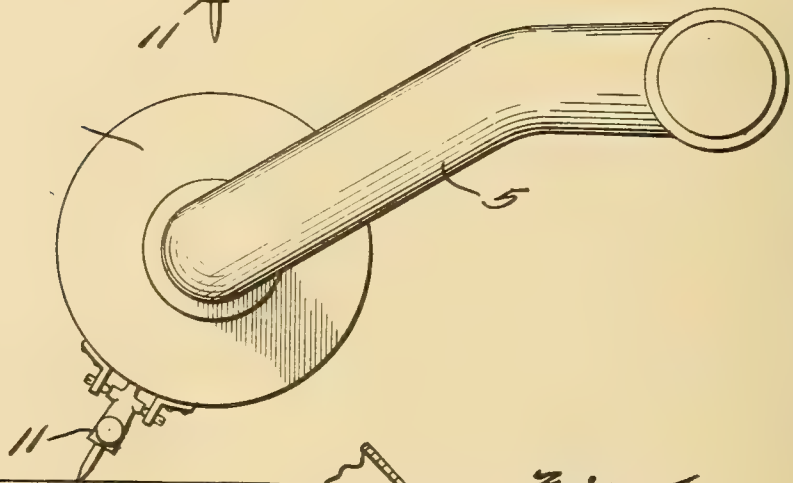


Fig. 3.

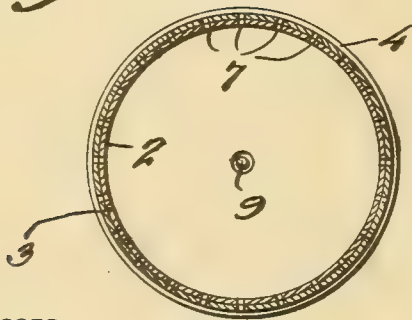
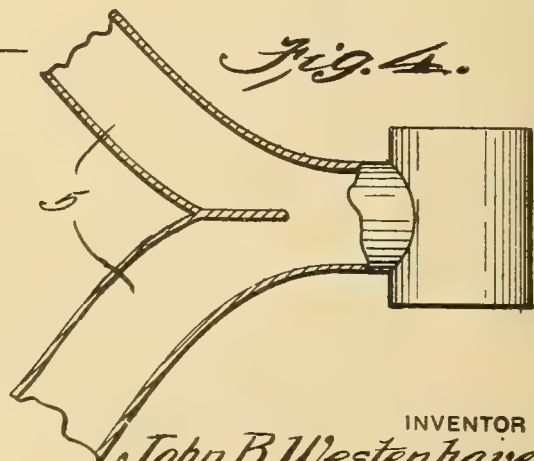


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN B. WESTENHAVER, OF WHEELING, WEST VIRGINIA.

SOUND-BOX FOR PHONOGRAPHS.

1,259,815.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Application filed June 15, 1917. Serial No. 174,992.

To all whom it may concern:

Be it known that I, JOHN B. WESTENHAVER, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented certain new and useful Improvements in Sound-Boxes for Phonographs, of which the following is a specification.

This invention relates to sound boxes for phonographs and aims primarily to provide a device which will amplify the sound without distorting the sound waves, and which will eliminate the emission of scratchy and grinding sounds common to sound boxes of the diaphragm and reproducing needle type.

Another object is to provide a plurality of diaphragms which are separated from each other in such manner that the sounds from each diaphragm will be independently carried off and mingled at a point remote from the diaphragm.

A further object is to provide a sound box which is perforated adjacent each diaphragm to make the operation of the latter more efficient and augmenting the clarity of the projected sound.

The above and other objects and advantages of this invention will be in part described, and in part understood from the following description of the present preferred embodiment, the same being illustrated in the accompanying drawings, in which:

Figure 1 is a top plan view, partly in section of a sound box constructed in accordance with my invention.

Fig. 2 is an end elevational view of the same.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1, and

Fig. 4 is a detail top plan fragmentary view of the sound ways used in my invention.

In the drawings a sound box generally designated 1 is provided which consists of a sectional inner shell 2 and an outer shell 3. The opposite ends of the outer shell are provided with screw threads for engagement with screw threaded caps 4, the latter being provided with central openings, in which the ends of the sound ways or tubes 5 are

mounted. It will be noted that the tubes 5 join at a point remote from the sound box so that the sound carried through the tube tributaries will mingle before being projected into the atmosphere.

A pair of diaphragms 6 made of any suitable material, are mounted in rubber rings carried between certain of the sections of the inner shell 2, the adjacent sections being provided with perforations 7 which aline with corresponding perforations in the outer shell 3. Partitions 8 are engaged with the opposite margins of the perforated sections of said inner shell, from that with which the rubber diaphragm engaging ring are in contact, said partitions being provided with central openings. It will be noted that the partitions 8 are held in spaced apart relation by one of the sections of the inner shell 2. A sound arm 9 is mounted through the openings of the partitions 8 and has the opposite ends thereof engaged with the diaphragms 6. A stylus bar 10 extends downwardly from the sound arm and is provided with the usual needle holder 11.

In use of the above constructed device, it will be appreciated that sound will be emitted from the opposite ends of the sound box into the tributaries or tubes 5. In view of the partitions 8, the sound is not permitted to mingle within the sound box 1 so that in this way the sound from each diaphragm will be independently carried off. Moreover by providing the sections with the perforations 7, accurate and efficient operation of the diaphragm 6 is insured so as to in no way distort the sound waves.

It will be understood that the above description and accompanying drawings comprehend only the general and preferred embodiment of my invention and that various minor changes in details of construction, proportion and arrangement of parts may be made within the scope of the appended claim without sacrificing any of the advantages of my invention.

I claim:

A sound box including a cylindrical body the ends of which are equipped with communicating sound conveying tubes, a diaphragm mounted adjacent each end of the

housing, a partition arranged in proximity to each diaphragm, said housing being perforated between each partition and diaphragm, a sound arm extending through said partitions and engaged with said diaphragms, and a stylus arm depending from the sound arm.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. WESTENHAVER.

Witnesses:

W. L. WESTENHAVER,
MEY ROBERT WHYTE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

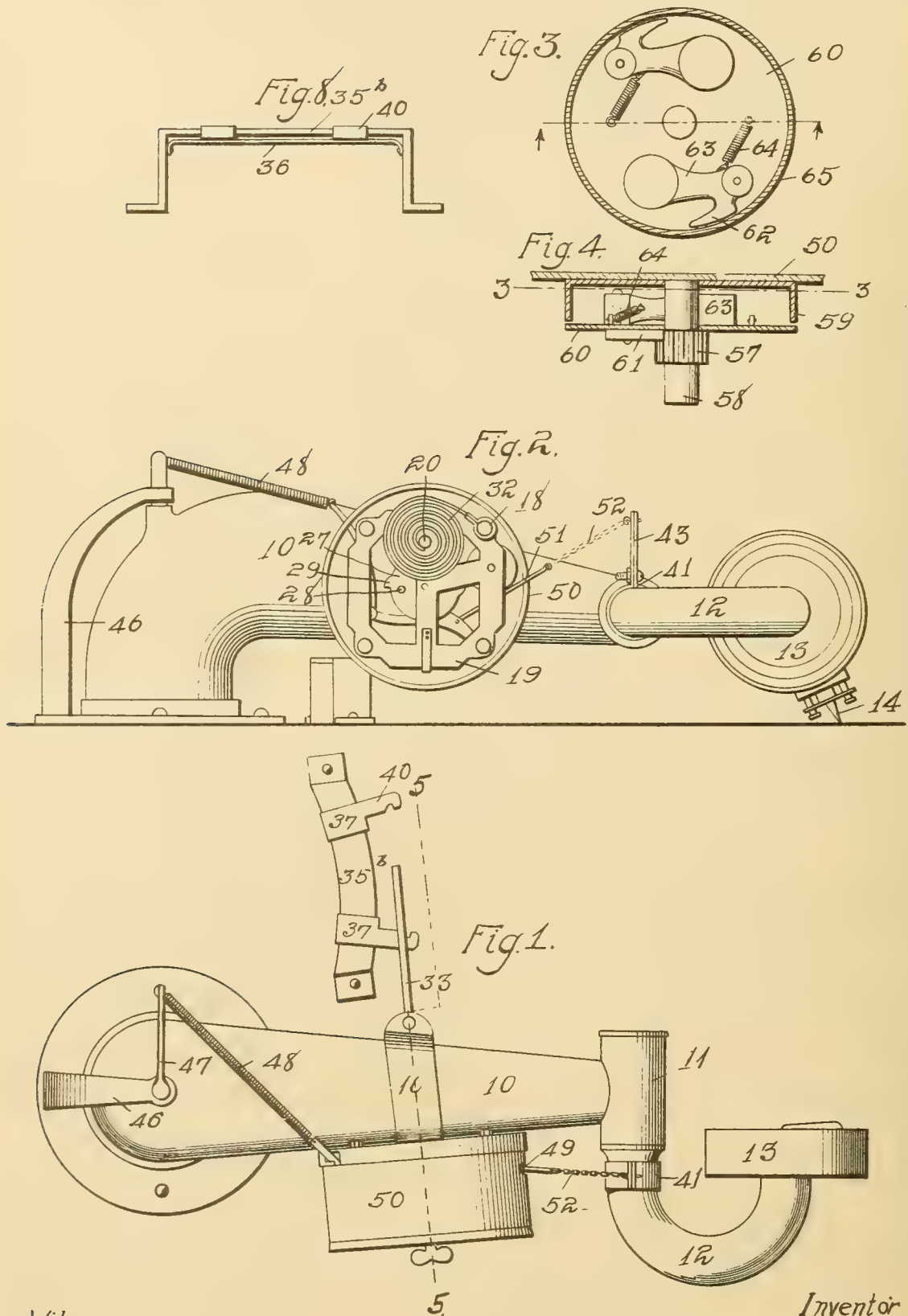
ATTACHMENT FOR TALKING MACHINES,

1,259,916 ----- W. A. Sharp,
Filed May 14, 1917,
Patented Mar. 19, 1918.

W. A. SHARP.
ATTACHMENT FOR TALKING MACHINES.
APPLICATION FILED MAY 14, 1917.

1,259,916.

Patented Mar. 19, 1918.
2 SHEETS—SHEET 1.



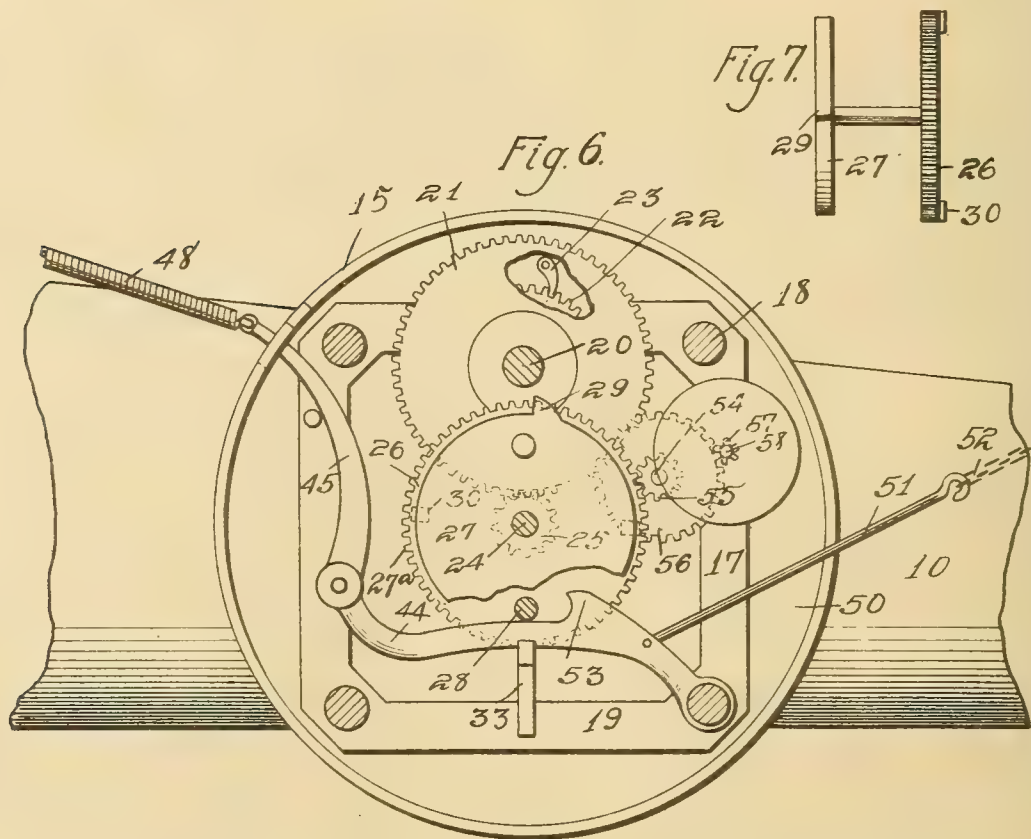
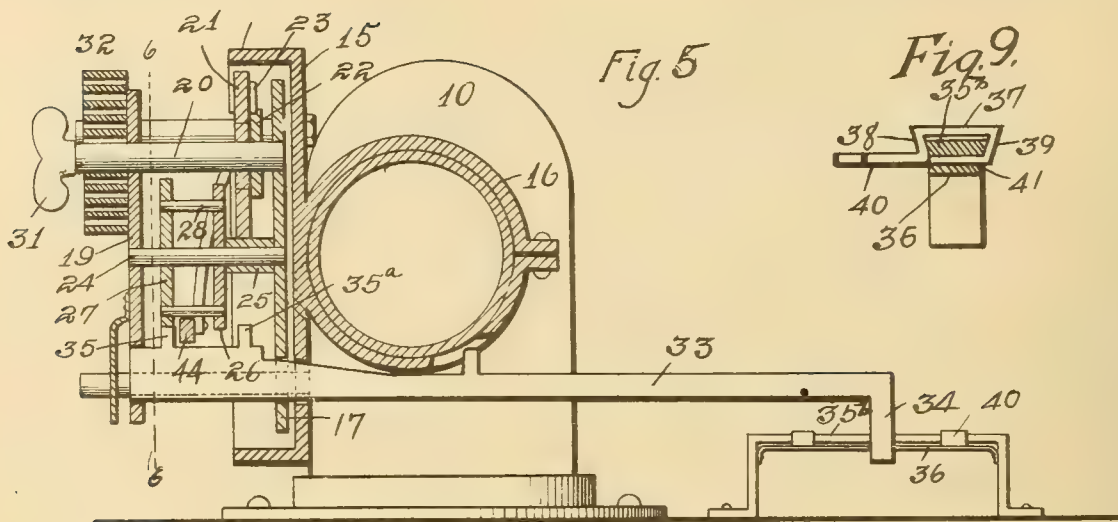
Witness
R. J. Hamlin.

Inventor
W. A. Sharp.
By Erving & Baird Attys

W. A. SHARP.
ATTACHMENT FOR TALKING MACHINES.
APPLICATION FILED MAY 14, 1917.

1,259,916.

Patented Mar. 19, 1918.
2 SHEETS—SHEET 2.



Witness
R. J. Hamlin.

Inventor
W. A. Sharp
By Craig & Rain Attys

UNITED STATES PATENT OFFICE.

WILLIAM ATWOOD SHARP, OF DES MOINES, IOWA.

ATTACHMENT FOR TALKING-MACHINES.

1,259,916.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Application filed May 14, 1917. Serial No. 168,617.

To all whom it may concern:

Be it known that I, WILLIAM ATWOOD SHARP, a citizen of the United States, and resident of Des Moines, in the county of Polk and State of Iowa, have invented a certain new and useful Attachment for Talking-Machines, of which the following is a specification.

The object of my invention is to provide an attachment for talking machines, adapted to automatically lift the needle when the phonograph arm reaches one position of its movement, and automatically return the arm to its opposite movement and drop the needle again to position for engaging the record.

More particularly it is my object to provide means carried by a phonograph tone arm adapted when the record has been played to automatically operate for lifting the sound box, and the needle carried thereby, and then to swing the tone arm back to its starting position, and when the arm has reached such position to gently lower the sound box for lowering the needle to operative position.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 shows a top or plan view of a phonograph tone arm with the sound box thereon, the device being equipped with an attachment embodying my invention.

Fig. 2 shows a side elevation of the same, part of the case for the operating mechanism being removed.

Fig. 3 shows a vertical, sectional view taken on the line 3—3 of Fig. 4.

Fig. 4 shows an inverted horizontal, sectional view taken on the line 4—4 of Fig. 3.

Fig. 5 shows a transverse, vertical, sectional view taken on the line 5—5 of Fig. 1.

Fig. 6 shows a vertical, sectional view taken on the line 6—6 of Fig. 5.

Fig. 7 shows a front elevation of part of the mechanism.

Fig. 8 shows a detail view of part of the device, and

Fig. 9 shows a detail, sectional view of the device shown in Fig. 8.

In the accompanying drawings, I have

used the reference numeral 10 to indicate generally the swinging tone arm of a phonograph having at its free end a transverse member 11, in which is pivotally mounted the supporting arm 12 of the sound box 13, which carries the needle 14.

My improved attachment comprises a casing 15 detachably secured by means of a clamp 16 to the arm 10, as shown. Within the casing 15 is a frame 17, adjacent to what I shall call the rear wall of the casing, and suitably held in position by screw-bolts 18 extended through the opposite walls of the casing.

Mounted on the bolts 18 and spaced from the frame 17 within the casing wall is a second frame 19. Mounted in the frames 17 and 19 is a shaft 20. On the shaft 20 is rotatably but nonslidably mounted a gear 21, adjacent to which is a ratchet wheel 22 fixed on the shaft 20. On the gear 21 is a spring pawl 23, the free end of which is held in yielding engagement with the ratchet wheel 22.

A shaft 24 is mounted in the frame members 17 and 19.

On the shaft 24 is a small gear 25 which meshes with the gear 21.

Fixed on the shaft 24 are spaced annular disks 26 and 27 which are connected by rods or pins 28 spaced from the shaft 20, on opposite sides thereof inwardly from the periphery of said disks. On the periphery of the disk 27 are opposite lugs 30 arranged quartering with relation to the lugs 29. The disk 27 has gear teeth 27^a.

The shaft 20 projects through the casing member 15^a and is designed to receive on its outer end a key 31. Outside the casing, a coil spring 32 has one end fixed to the casing member 15^a and the other end fixed to the shaft 20. By means of the key, the shaft 20 can be rotated for winding up the spring 32 and the pawl and ratchet are so arranged as to prevent the rotation of the gear 21 against the spring tension, except when the shaft is given rotation.

Extended transversely through suitable openings in the walls of the casing is a bar 33, adapted to slide longitudinally. The bar 33 has at its end, farthest from the casing 15, a downwardly extending arm 34. The bar 33 is provided on its upper surface within the casing with lugs 35 and 35^a. The lug 35 is so arranged that in one position of

the bar 33 it registers with the path of travel of the lugs 29, and in another position of the bar, the lug 35 is out of the path of travel of the lugs 29. In the first
5 of said positions of the lug 35 the lug 35^a is out of the path of travel of the lugs 30, while in another position of the bar 33, the lug 35^a is in the path of the lugs 30.

Suitably supported adjacent to the lower
10 end of the arm 34 is a stop device comprising an inverted U-shaped bracket 35^b. The upper bar or cross member of the bracket 35 is beveled at its side edges, as shown in Fig. 9. Below said bar is a spring 36 adapted
15 to press upwardly toward said bar.

Mounted on the upper bar of the bracket 35^b is a pair of adjustable supports, each of said arms comprising a horizontal member 37, resting on top of said bar having at
20 its ends downwardly inclined members 38 and 39 adapted to engage the beveled edges of said bar.

At the lower end of the member 38 is a laterally projecting arm 40 extending in the
25 path of movement of the arm 34. At the lower end of the arm 39 is a laterally projecting arm 41, between the spring 36 and the horizontal bar of the bracket 35^b, and spaced from the member 37 a distance
30 greater than the thickness of said bar.

The spring 36 engages the members 41 of the adjustable engaging arms, and tends to normally hold said adjustable engaging arms in their raised positions where the
35 members 37 and 39 frictionally engage the beveled edges of the bracket 35^b.

When it is desired to adjust said adjustable arms longitudinally of the members 35^b, the operator presses downwardly on the
40 member 37 against the pressure of the spring 36, until the members 38 and 39 are free from frictional engagement with the bracket 35^b, and slides the adjustable engaging arms longitudinally on said bracket.

Pivoted to the lower portion of the frame 17 on the side thereof adjacent to the free
45 end of the tone arm 10, is a lever 44, which extends from its pivot above and across the arm 33 between the disks 26 and 27 toward the pivoted end of the tone arm 10, as illustrated in Fig. 7.

Pivoted to what might be called the rearward end of the lever 44 is a slightly curved link 45, extending upwardly and through a
55 suitable opening in the casing 15.

Fixed to the frame 46, which assists in supporting the tone arm 10 is a laterally extending arm 47, to which is secured a coil spring 48, which extends across the upper
60 portion of the tone arm, and is secured to the upper end of the link 45.

Pivoted to the lever 44 and extended through a suitable opening 49 in the casing member 50 is a link 51, the upper end of
65 which is secured to a chain 52. The chain

52 is secured to the upper end of an arm 43 which extends away from the clamp device 41 on the member 12.

The lever 44 is provided on its upper surface with a hook member 53, such as that
70 shown in Fig. 6, and for a purpose hereinafter mentioned.

Suitably mounted on the frame members 17 and 19 is a shaft 54, on which is mounted a gear 55 in mesh with the gear 27. On the
75 shaft 54 is a gear 56 meshing with the gear 57, as shown in dotted lines in Fig. 6, on the shaft 58 similarly shown in the same figure.

Fixed to the casing member 50, and mounted on the shaft 58 to permit the rotation of the shaft 58, is a casing member 59. Fixed on the shaft 58 adjacent to the gear
80 57 is a disk 60 to which is pivoted a spring pawl 61 adapted to coact with the gear 57.

Pivotally mounted on the disk 60 are
85 brake shoes 62 on which are weighted arms 63.

The brake shoes 62 are adapted in certain of their positions to engage the peripheral wall 65 of the casing 59.
90

Secured to each brake shoe 62 and to the disk 60 is a spring 64 adapted to yieldingly hold the brake shoes away from the wall 65.

In the practical operation of my improved device, I will assume that the parts are in
95 the position shown in Figs. 5 and 6, and that the tone arm is substantially midway in its swinging movement from position where the needle 14 is above the center of the disk toward position where the needle
100 is above the disk near its periphery.

It will of course be understood that the operation of the device is substantially the same where a machine is used in which the
105 needle is moved from the center to the periphery of the disk in playing a record.

As the tone arm 10 swings from its position, shown in Fig. 5, toward the right, the arm 34 will engage the member 40. Such swinging movement is caused by the tension
110 on the spring 48.

The tone arm will have some momentum in its swinging movement, and when the arm 34 strikes the member 40, the bar 33 will be shoved toward the left until the lug
115 35 moves out of engagement with the lug 29, whereupon the tension of the spring 32 will impart rotation to the shaft 20, the gear 21, the gear 25, and the disks 26 and 27. The lug 35^a will move into the paths
120 of the lugs 30.

As the disks 26 and 27 rotate, the lower pin 28 will enter the notch formed adjacent to the hook or catch member 53, tending to swing the arm 44 upwardly. The weight
125 of the sound box will also move the swinging arm 44 upwardly as soon as the lower pin 28 moves upwardly.

The rotation of the disk 26 imparts rotation to the disk 60, and the centrifugal force
130

of the weighted arms 63 will move the brake shoes 62 into engagement with the wall 65 for causing the tone arm to be lowered gradually and gently on the record.

5 It is obvious that the disk 60 may spin a short distance after the needle has been lowered upon the record on account of the arrangement of the pawl 61 with relation to the gear 57.

10 It should be mentioned in this connection that the gear 57 is wide enough to permit it to engage the pawl 61 and also to engage the gear 56.

After the disks 26 and 27 have moved a
15 quarter revolution, one of the lugs 30 will engage the lug 35^a. The record will then be played until the tone arm swings toward the left, and until the member 34 engages the other member 40, at which time the bar
20 33 will be moved toward the right with relation to the tone arm, moving the lug 35^a out of the path of the lugs 30, and moving the lug 35 into the path of the lugs 29. Another quarter revolution will be imparted to
25 the disks 26 and 27. At the beginning of this quarter revolution, the pin 28 leaves the hook member 53, which has been raised sufficiently to allow it to clear the pin 28, and as the quarter revolution continues the other
30 pin 28 will engage the arm 44 forcing it downwardly and thereby raising the sound box 13, and also imposing greater tension on the spring 48. This tension will tend once more to swing the tone arm 10 toward
35 position where the sound box and needle are above the record near its periphery.

The spring 32 should be wound up at proper times to keep it under tension during the operation of the machine.

40 It will be seen that the brake shoes, hereinbefore described, with the weighted arms thereon, and the parts connected therewith, serve as a brake or cushioning device for preventing the sudden operation of the machine, and preventing jar or undue vibration
45 of the parts of the mechanism.

The device is a comparatively simple construction, and is so made that it may be mounted as an attachment on a phonograph.

50 Some changes may be made in the construction and arrangement of the parts of my improved device without departing from the essential purposes of my invention, and it is my intention to cover by the
55 claims of the patent to be issued upon my application, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within the scope of my claims.

60 I claim as my invention:

1. In a device of the class described, a swinging tone arm, a sound box pivotally mounted thereon, means for raising and lowering said sound box and for swinging
65 said tone arm on its pivot, said means in-

cluding a spring, a motor device, a flexible member connected with said sound box, a pivoted lever connected with said flexible device and said spring, means actuated by
70 said motor device for moving said lever for increasing the tension of said spring and moving said flexible device for raising said sound box.

2. In a device of the class described, a swinging tone arm, a sound box pivotally
75 mounted thereon, means for raising and lowering said sound box and for swinging said tone arm on its pivot, said means including a spring, a motor device, a flexible member connected with said sound box, a
80 pivoted lever connected with said flexible device and said spring, means actuated by said motor device for moving said lever for increasing the tension of said spring and moving said flexible device for raising said
85 sound box, and means for rendering said flexible device operative when the tone arm reaches one position of its movement, and for making it inoperative when the tone arm reaches another position of its move-
90 ment.

3. In a device of the class described, a swinging tone arm, a sound box pivotally supported thereon, a yielding device operatively connected with said tone arm for
95 tending to swing the tone arm to one position of its movement, a motor device, means including a spring motor for simultaneously raising said sound box and increasing the tension of said yielding device, means for
100 intermittently operatively connecting said last means with said motor device, and a centrifugal brake operatively connected with said motor for regulating its action.

4. In a device of the class described, a
105 swinging tone arm, a sound box pivotally supported thereon, a spring device operatively connected with said tone arm and adapted to swing said tone arm to a certain position of its movement, means for
110 raising said sound box and for increasing the tension of said spring device, said means including a lever operatively connected with said spring device and said sound box, a rotary device, means carried by said rotary
115 device for engaging said lever in certain positions of the rotary device, means tending to rotate said rotary device, and means operated by the swinging tone arm for intermittently locking said rotary device
120 against rotation.

5. In a device of the class described, a swinging tone arm, and a sound box pivotally mounted thereon, in combination with a lever pivotally supported on said arm, a
125 yielding device connected with said lever and with a fixed support, means for operatively connecting said lever with said pivoted sound box, the parts being so arranged that when said lever is in one position the
130

tension on said yielding device is increased and said sound box is raised, and when the lever is in another position such tension is lowered and the sound box is lowered, means
5 for moving said lever to the first of said positions, a slidable bar carried by said tone arm and adapted in certain positions to render said last means inoperative, and in other positions to permit said last means
10 to operate, adjustable means for limiting the movement of said bar when said tone arm swings, for thereby limiting the swinging movement of the tone arm and also for moving said slidable bar to its different
15 positions.

6. In a device of the class described, the combination of a swinging phonograph arm having a sound box pivoted thereon, with means whereby when said arm reaches one po-
20 sition of its movement said sound box is lifted, said arm is swung to another position

and the sound box lowered, said means including a slidable bar carried by said arm, having a projecting member, and adjustable devices arranged to stand in different posi- 25 tions in the path of said member.

7. In a device of the class described, the combination of a swinging phonograph arm having a sound box pivoted thereon with means whereby when said arm reaches one 30 position of its movement said sound box is lifted, said arm is swung to another position and the sound box lowered, said means including a slidable bar carried by said arm, having a projecting member, and means for 35 limiting the movement of said member comprising a bar, stop devices slidably mounted thereon, and means for normally, yieldingly locking said stop devices on said bar in the path of movement of said member.

Des Moines, Iowa, May 11, 1917.

WILLIAM ATWOOD SHARP.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TONE MODULATOR FOR PHONOGRAPHS.

1,260,001 ----- C. C. Kuo,
Filed Nov. 2, 1916,
Patented Mar. 19, 1918.

1,260,001.

Fig. 1.

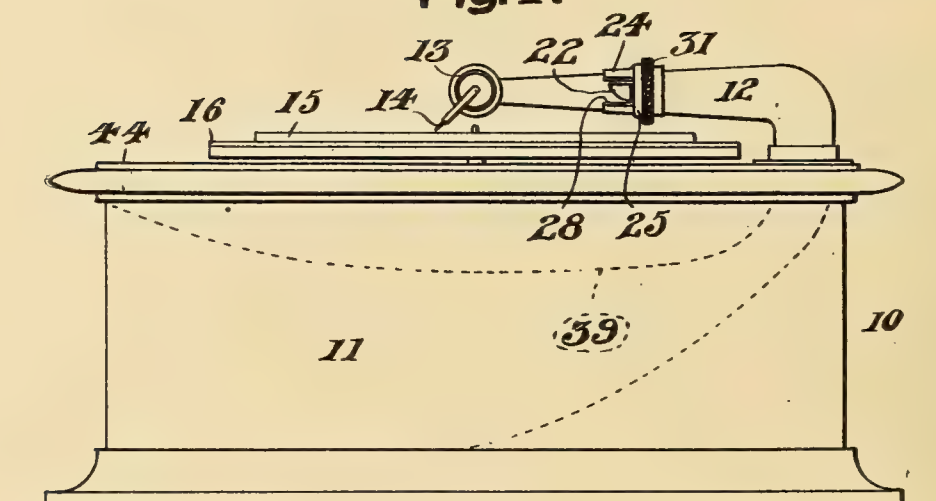


Fig. 2.

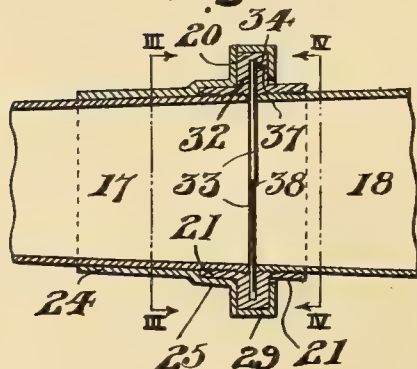


Fig. 3.

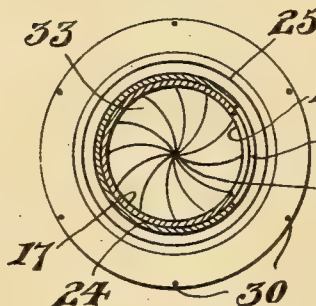


Fig. 4.

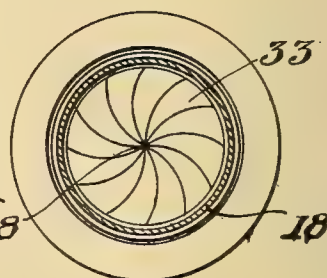


Fig. 7.

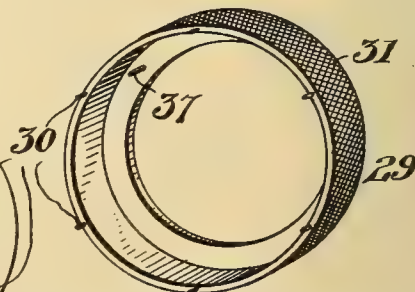


Fig. 5.

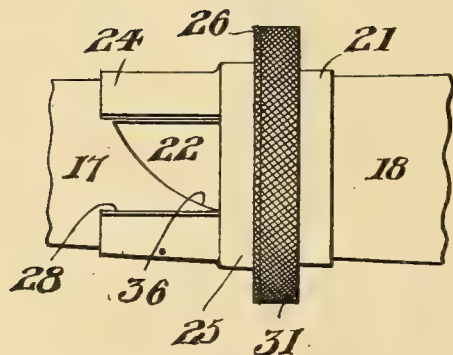
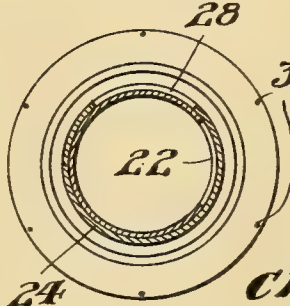


Fig. 6.



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Fig. 8.

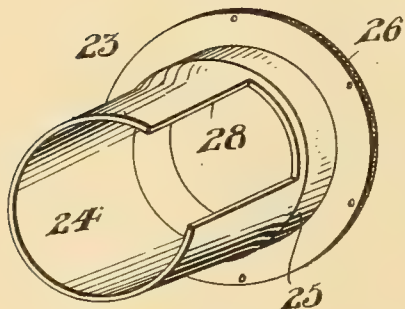


Fig. 11.

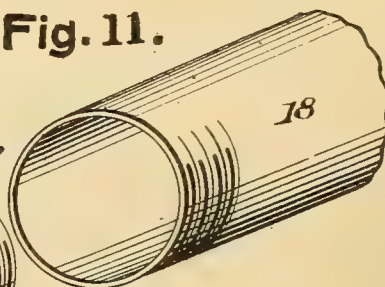


Fig. 10.

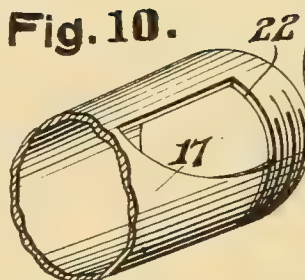


Fig. 13.

Fig. 9.

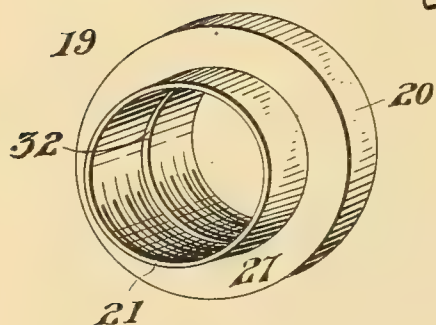


Fig. 12.

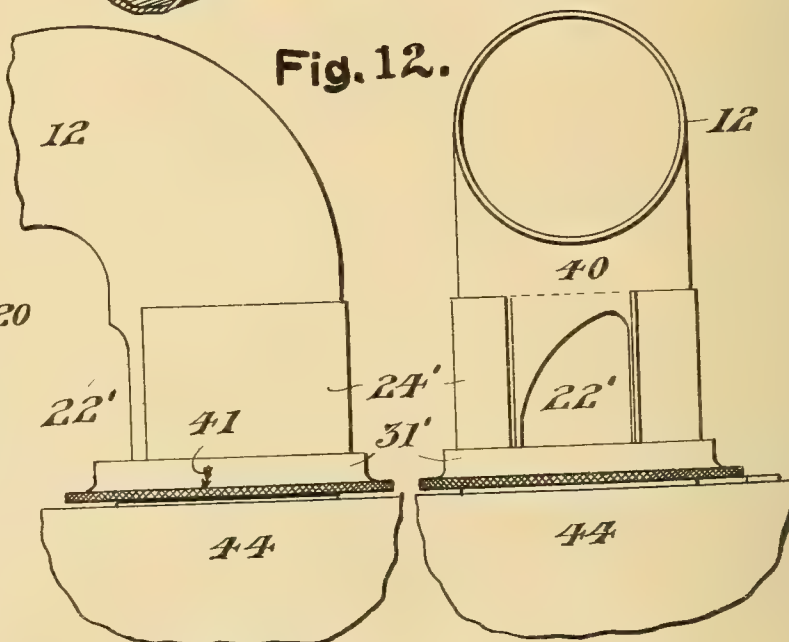
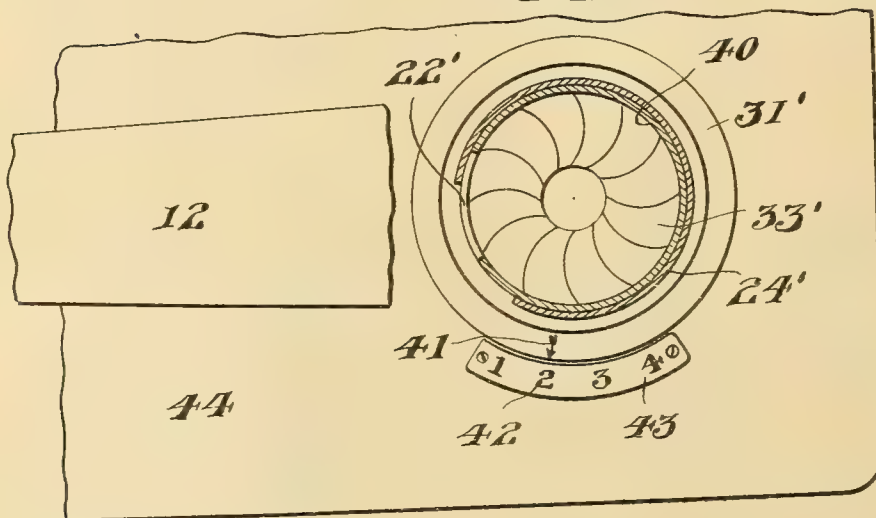


Fig. 14.



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Witness
Lester St. Homball

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UNITED STATES PATENT OFFICE.

CHENG CHIH KUO, OF ITHACA, NEW YORK.

— TONE-MODULATOR FOR PHONOGRAPHS. —

1,260,001.

Specification of Letters Patent.

Patented Mar. 19, 1918.

Application filed November 2, 1916. Serial No. 129,085.

To all whom it may concern:

Be it known that I, CHENG CHIH KUO, a citizen of China, residing at Ithaca, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Tone-Modulators for Phonographs, of which the following is a specification.

This invention relates to certain new and useful improvements in tone modulators for phonographs.

The primary object of the invention is the provision of an attachment for any form of phonograph or talking machine whereby the intensity of the tone produced thereby is easily modulated agreeable to the wishes of the operator without destroying the tone effects of the instrument.

A further object of the device is to provide a ready means for regulating the quantity of sound emanating from a phonograph by shunting a desirable quantity thereof exteriorly of the instrument prior to its reception by the horn or other resonator employed thereby.

A still further object of the invention is to provide a means for contracting to a desired degree or entirely closing the sound transmitting conduit for regulating the amount of sound entering the horn member of the instrument and venting the balance to the atmosphere prior to entering the horn.

It is often found desirable in operating a phonograph to limit the amount of sound emanating therefrom without destroying the quality of the tone so that the operator may freely enjoy the use of the instrument without annoying others who are more or less distantly situated.

With these general objects in view and others that will appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and then claimed.

In the drawings forming a part of this application and in which like designating characters refer to corresponding parts throughout the several views:—

Figure 1 is a side elevation of a phonograph provided with the present device.

Fig. 2 is a central longitudinal sectional view through the device.

Fig. 3 is a transverse sectional view taken upon line III—III of Fig. 2, showing the

damper in its closed and the port in its open position.

Fig. 4 is a transverse sectional view taken upon line IV—IV of Fig. 2. 60

Fig. 5 is a side elevation of the device with the parts arranged as shown in Fig. 3.

Fig. 6 is a view similar to Fig. 3, with the port closed and the damper in its open invisible position. 65

Fig. 7 is a perspective view of the operating sleeve of the device.

Fig. 8 is a perspective view of the sleeve valve for the sound port.

Fig. 9 is a perspective view of the damper casing. 70

Figs. 10 and 11 are perspective views of adjacent portions of the sound conducting tube of the phonograph adapted to be connected by the damper casing. 75

Fig. 12 is a side elevation of the invention arranged at a different point upon the instrument, the sound port being shown open.

Fig. 13 is a front elevation thereof, and,

Fig. 14 is a horizontal sectional view of the same with the damper and port partially closed, a portion of the sound tube and the instrument being shown in top plan. 80

The sound modulator herein set forth mainly relies for its efficiency on the simultaneous regulation of the diameter of the sound tube and a vent port therein whereby the amount of sound admitted to the amplifying horn or resonator of the instrument is regulated without muffling or impairing the tone of the audible sound which is produced. 85

The device being applicable to any form of reproducing instrument, the same as herein illustrated in connection with a phonograph 10 having a rectangular cabinet 11 upon which the arm or sound tube 12 is swingingly mounted, a sound box 13 being carried by the free end of the said tube provided with a needle 14 adapted for traveling upon a record disk 15 placed upon the revolving table 16. 90

The sound tube 12 tapers toward its free end and the sound box 13, the same being interrupted or severed intermediate its ends providing two sections 17 and 18 adapted for connection in axial alinement by means of the damper casing 19, the latter having an enlarged annular central portion 20 and opposite bushings 21 adapted to overlie the adjacent threaded ends of the tube portions 17 and 18 arranged threaded therein. 105 110

An outlet port 22 is provided in one side of the tube portion 17 being substantially of the form of a quadrant of a circle and adapted for allowing the sound from the box 13 to pass therethrough.

A sleeve valve 23 and having a slightly tapered sleeve portion 24 is revolubly journaled upon the tube portion 17 with an enlarged inner end 25 arranged over the adjacent bushing 21 and having a base flange 26 fitting against the adjacent face 27 of the damper casing 19. A slot 28 is arranged in a sleeve 24 of a width slightly greater than that of the port 22 whereby the latter may be entirely opened upon proper adjustment of the said sleeve. An operating collar 29 is journaled upon the central portion 20 of the damper casing and is connected to the valve 23 in any convenient manner such as by means of pins 30 headed through the flange 26 of the said valve, a knurled or roughened exterior surface 31 being provided for the said collar 29 whereby the sleeve is readily rotated for suitably positioning the slot 28 as desired, relatively of the port 22.

The central portion 20 opens inwardly as at 32 within the casing 19 for the accommodation of a plurality of diaphragm plates 33 arranged in the usual manner for opening and closing upon an actuation by a suitable member 37 extending through a side slot 34 in the casing 19 and operatively attached to the collar 29. It being understood that the specific form of diaphragm including the plates 33 and the manner of opening and closing the same is the well-known structure and further details thereof are unnecessary herein, it is only essential that the diaphragm consisting of the plates 33 be regulatable within the sound tube 12 for varying the diameter thereof under the control of an exterior member, such as the collar 29 by means of which the valve 23 is simultaneously actuated.

The sleeve 23 and collar 29 are so positioned upon the casing 19 that the slot 28 entirely uncovers the port 22 when the diaphragm plates 33 are entirely closed as best illustrated in Figs. 3, 4 and 5 of the drawings, it being understood that by turning the collar 29 the valve 33 is operated for gradually closing the port 22, moving in a direction first overlying the tapered side 36 thereof and moving until the port 22 is closed and the diaphragm plates 33 are entirely retracted within the casing portion 20, the elements then being as illustrated in Fig. 6 of the drawings.

With the device arranged as illustrated in Fig. 1, the entire sound from the box 13 passes through the tube section 17 and hitting the baffle damper 38 formed by the plates 33 which are closed, the same passes laterally through the port 22. Without the

provision of the port 22, the sound would be muffled and the tone thereof injured while by the present arrangement, the tone is unimpaired and the amount of amplitude is regulated by the quantity of sound allowed to pass through the damper 38. By turning the collar 19 for gradually closing the valve sleeve 24 over the sound port 22, the damper 38 is gradually opened until the port is completely closed, at which time the damper is entirely retracted, leaving the entire diameter of the tube for free passage of the sound from the box 13 there-through to the resonator or horn member, such as 39 arranged within the cabinet 11. The damper 38 may be shifted to any degree as a baffle for the tone forcing the sound outwardly through the adjacently positioned port 22, an intermediate positioning of the damper 38 and valve 23 being illustrated in Fig. 14 wherein the invention is shown arranged adjacent the pivoted end or base 40 of the sound tube 12 at its point of connection with the top of the cabinet 11, it being noted that the sound port 22' therein shown is arranged in the inner side of the tube while the sleeve valve 24' is carried by the turn collar 31' for opening the port 22' simultaneously with the closing of the damper plates 33' and vice versa similar to the operation hereinbefore described. A pointer 41 is carried by the collar 31' for registering with graduations 42 upon a plate 43 carried by the top 44 of the cabinet 11, it being noted that the collar 31' and sleeve valve 24' are adapted to turn bodily with the tube 12 as heretofore described.

The sound waves from the box 13 are allowed to freely pass through the lateral port in the sound tube 12 by reason of the position of the port being substantially at the position of the baffle damper or diaphragm by the tube so that a readily operable serviceable attachment is provided whereby the tone of a phonograph is readily modulated as found desirable, the device being easily and inexpensively manufactured although highly efficient in its operation.

While the form of the invention herein shown and described is what is believed to be the preferred embodiment thereof, it is nevertheless to be understood that various forms, modifications and arrangements of the parts may be made without departing from the spirit and scope of the invention as claimed.

What I claim as new is:

1. A tone modulator attachment for sound tubes having a side outlet port, including a diameter changing damper for said tube, and a rotatable sleeve valve for said port surrounding said tube and operatively connected to said damper whereby the port and diameter of said tube are oppositely varied simultaneously.

2. A sound modulator comprising in combination, a sound tube having a lateral outlet port, a diameter changing damper arranged within said tube adjacent said port, 5 operating means for said damper, and a rotatable sleeve valve for controlling the port surrounding the sound tube and attached to said operating means whereby the port is closed simultaneously with the opening of 10 said damper.
3. A sound modulator for phonographs comprising a sound tube having a side outlet port, a damper casing carried by said tube, a diameter changing damper within 15 said casing and arranged in closing relation with respect to the tube, operating means for said damper, and a sleeve valve for said port carried by said operating means and arranged overlying said port when the 20 damper is opened, said port being automatically opened when the damper is closed.
4. A tone modulator comprising in combination, a sound tube for a phonograph having a substantially quadrant shaped side outlet port, a sleeve valve for said port hav- 25 ing a slot of greater width than that of the port, a diameter changing damper within said tube operatively connected to said valve and operable simultaneously therewith in the opposite direction thereto. 30
5. A tone modulator comprising in combination, a sound tube carried by an instrument casing and having a side outlet port, a diameter changing damper within said tube adjacent the cabinet and the port, an operat- 35 ing sleeve for said damper adjacent the cabinet, and a sleeve valve for said port carried by said sleeve and surrounding the tube whereby said port and the diameter of the tube may be oppositely varied simulta- 40 neously.

In testimony whereof I affix my signature.

CHENG CHIH KUO.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPHIC ATTACHMENT FOR MOVING PICTURE MACHINES.

1,260,337 ----- R. M. Craig,
Filed May 6, 1913,
Patented Mar. 26, 1918.

R. M. CRAIG.
 PHONOGRAPHIC ATTACHMENT FOR MOVING PICTURE MACHINES.
 APPLICATION FILED MAY 6, 1913.

1,260,337.

Patented Mar. 26, 1918.
 3 SHEETS—SHEET 1.

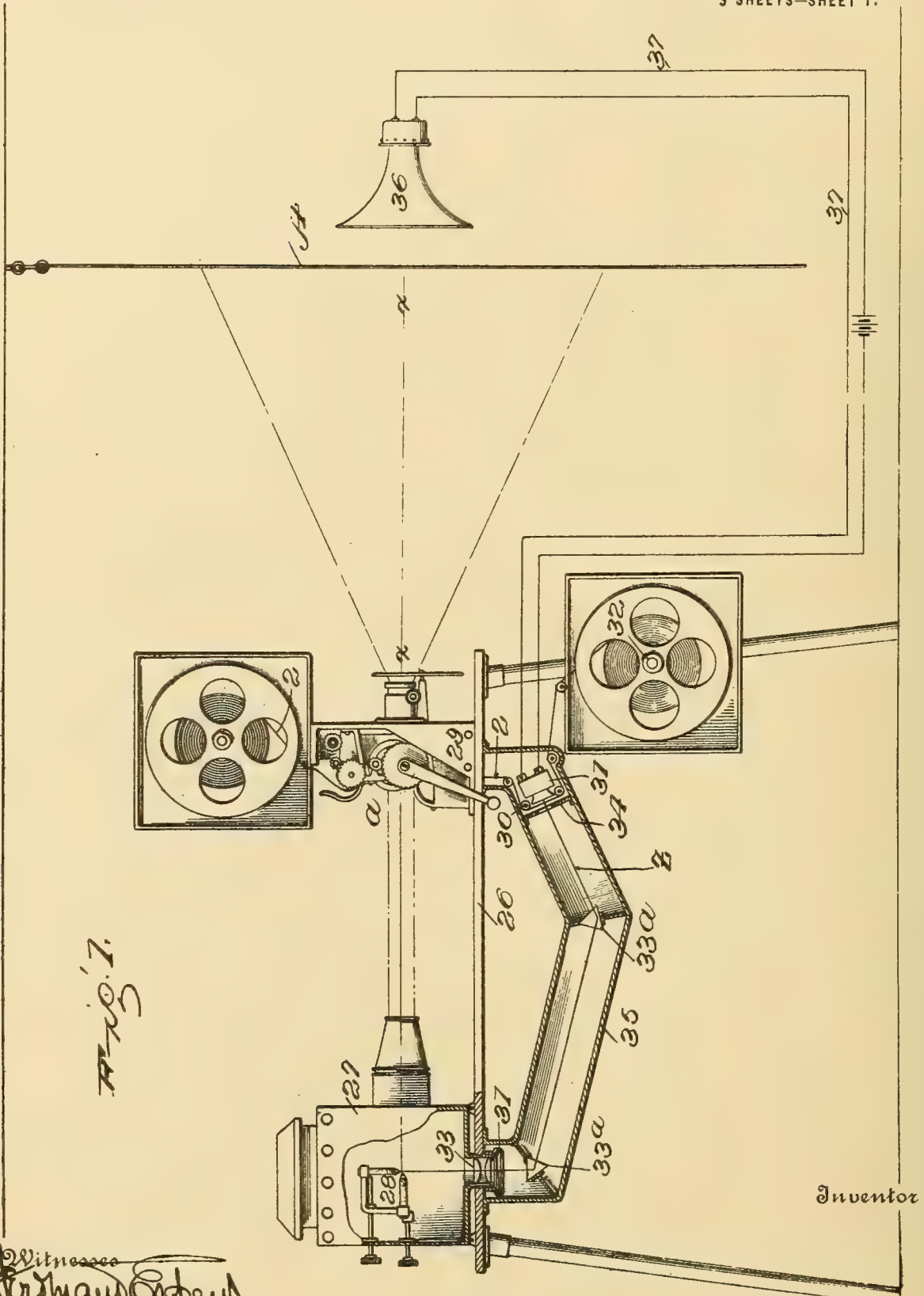
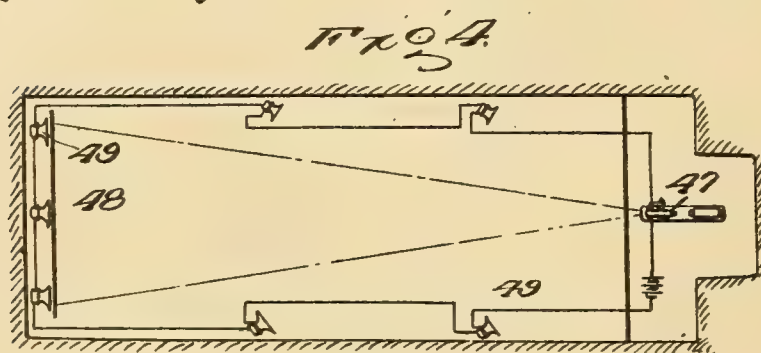
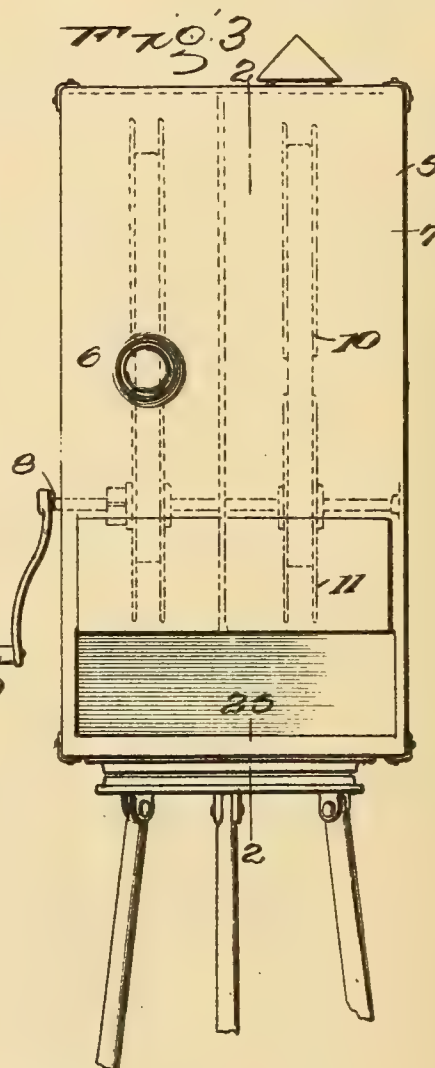


Fig. 1.

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Armand Espey
for Inve

By *R. M. Craig*
H. M. Tracy, Attorneys.

1,260,337.



Inventor
A. M. Craig

12 witnesses
Ferdinand Speyer
Jno. Smirre

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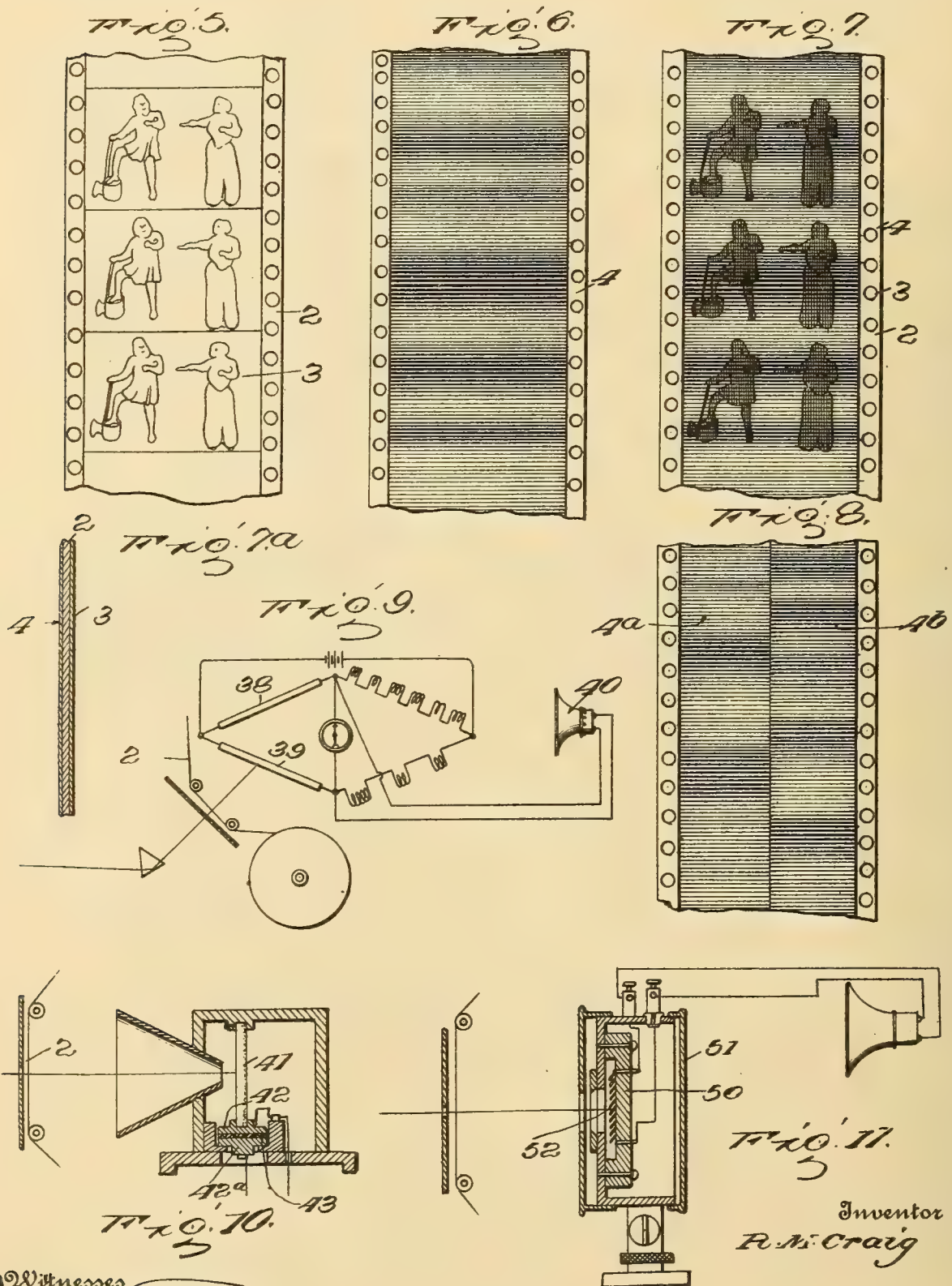
Harvey Attorneys.

R. M. CRAIG.
 PHONOGRAPHIC ATTACHMENT FOR MOVING PICTURE MACHINES.
 APPLICATION FILED MAY 6, 1913.

1,260,337.

Patented Mar. 26, 1918.

3 SHEETS—SHEET 3.



Witnesses
Richard E. Eddy
John E. Eddy

By

A. M. Tracy, Attorneys.

Inventor
R. M. Craig

UNITED STATES PATENT OFFICE.

RICHARD M. CRAIG, OF SAN ANTONIO, TEXAS.

PHONOGRAPHIC ATTACHMENT FOR MOVING-PICTURE MACHINES.

1,260,337.

Specification of Letters Patent.

Patented Mar. 26, 1918.

Application filed May 6, 1913. Serial No. 765,959.

To all whom it may concern:

Be it known that I, RICHARD M. CRAIG, citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Phonographic Attachments for Moving-Picture Machines, of which the following is a specification.

My invention relates to phonographic or "talking" moving pictures, and more particularly to the art of taking and projecting such moving pictures with the accompaniment of sound recording and sound reproduction respectively.

Many attempts have been made to secure with the reproduction of moving pictures, the reproduction of sounds correlated therewith. Almost all these attempts have been made by operating the moving picture film in conjunction with the ordinary phonograph or gramophone. The difficulty of using an instrument of this character to reproduce sounds correlated with the film is that the phonograph must of necessity be practically a separate machine from either the camera whereby the pictures are taken, or the projector whereby they are thrown upon the screen, and that with either the gramophone or the phonograph it is practically impossible to secure a sound record which shall be coterminous with the moving picture film. The maximum sound record as used today will not run for longer than five minutes, whereas the moving picture scene may be very much longer. Further than this, it is practically impossible to run the phonograph or gramophone in synchronism with the film and this is a very vital necessity for the proper correlation of the sound record with the pictures. Again, if the film runs off or breaks, the phonograph must be stopped, and it is almost impossible to again adjust the film in proper correspondence and correlation with the sound record. The mere connecting up of the sound reproducing mechanism with the mechanism of the moving picture machine will not secure a complete correspondence and correlation between the sound and the pictures, for the reason that the film is liable to slip and to tighten or loosen upon the reels, and it would be extremely hard to adjust the sound record so as to correspond accurately with the motion of the picture. An accurate correspondence of the sound

with the event with which the sound is correlated, is, of course, absolutely necessary to prevent a disjunction which would entirely spoil the effect.

Furthermore, the phonographic record can naturally contain only so many words and this requires the film to be made of a certain length only, this length corresponding with the phonographic record, instead of which the sound record should be made for and with the picture record of any possible scene or happening that might occur, and the sound record should have the same length as the scene record and not be limited as to length.

Again, the process of making phonographic records requires extra care and especially prepared staging. The phonograph is placed at or near the screen upon which the picture is to be projected and thus can not be run by the same mechanism which drives the moving picture film. The phonograph requires an extra attendant to place the records thereon. Furthermore, the picture record and the sound record have heretofore been taken separately and could not therefore be in accurate correspondence, nor could they ever be placed in accurate correspondence under these circumstances. It is a very difficult problem and requires an elaborate arrangement of costly mechanism to keep a film synchronized with a phonographic record. If the film happens to run off while exhibiting the phonographic record and the pictures on the film get out of time, it is practically impossible to get them in time again. If the film should happen to get torn in two or broken, which sometimes happens, and the film is cemented together, the words corresponding to the part torn out of the film can never be taken from the phonograph record, and this destroys the further use of the two together.

The primary object of my invention is the provision of mechanism whereby a sound record may be made or reproduced synchronously with the taking or reproduction of moving pictures.

A further object is to so form the sound recording or reproducing mechanism that it may be used with ordinary moving picture taking or reproducing mechanism so that no change will be required in the mechanism now used for this purpose.

A further object is to provide means

whereby the picture record and the sound record may be recorded simultaneously and by the same machine, under the control of the same operator and not individually and separately as they now are.

A further object is to provide means whereby the picture carrier, that is, the film, may also be the sound record carrier so that the pictures and the corresponding sounds shall be at all times in fixed relation to each other, taken simultaneously, reproduced simultaneously and with no possible chance of the sound record having its relation to the picture record in any way changed.

A further object is to so form the sound and picture carrier, in this case the film, that the sound may be reproduced without reproducing the picture, or the picture reproduced without reproducing the sound.

A further object is to so form the sound record that the sound vibrations may be translated into electrical vibrations, and these in turn carried to various parts of the hall within which the machine is to be used.

A still further object is to so construct the machine both for taking and reproducing the pictures and accompanying sounds that the method of operation shall be extremely simple, both as regards the taking and making of sound records and the taking and making of picture records, and as to the simultaneous or synchronous taking or reproduction.

A further object is to provide mechanism whereby the sounds may be recorded upon the picture carrying film of moving picture machines and reproduced therefrom, this film being so formed that the picture record and the sound record may overlies each other without the sound record interfering with the picture record or vice versa.

A further object of the invention is to so form the film that the picture record may be taken in the ordinary manner and printed photographically upon one side or face of the film while the sound record may be taken photographically and printed upon the other face of the film.

A further object in this connection is to provide a film for carrying moving pictures and accompanying sound records, in which the sound record is formed by a substance which does not affect or impair the transmission of ordinary or white light but which will impair, affect or be more or less impervious to the passage of rays beyond the visible rays of the spectrum.

A further object is to form a sound record upon a film capable of transmitting light, this sound record being formed by material which is pervious to ordinary white light but which is impervious to or affects the transmission of infra-red rays.

A further object is to so construct the mechanism for reproducing a sound record

in conjunction with the projection of moving pictures that while the film shall move at one point intermittently to reproduce the pictures, the film shall move steadily at another point to reproduce the sound record, and in this connection to provide mechanism for causing the projection of white light through that portion of the film which is moving intermittently and causing the projection of invisible rays through that portion of the film which is moving steadily, and further in this connection to provide in combination with the means for projecting the invisible rays through said film, sound transmitting mechanism of such character as to be operated by the action of these invisible rays to thereby reproduce the sound record on the film.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is an elevation partly sectional of a moving picture machine so constructed as to reproduce a corresponding sound, the figure also showing the screen upon which the picture record is thrown and a loud-speaking phone disposed behind the screen.

Fig. 2 is a vertical section on the line 2—2 of Fig. 3 of a camera for taking moving pictures making correlated sound records.

Fig. 3 is a front elevation of the camera shown in Fig. 2.

Fig. 4 is a diagrammatic plan view of a hall or auditorium showing the arrangement of phones for transmitting the sounds reproduced by my mechanism.

Fig. 5 is a fragmentary view of one side of a film showing moving pictures thereon.

Fig. 6 is a face view of the opposite side of a film showing photographic sound records thereon.

Fig. 7 is a view of a composite film showing the position of the sound records with relation to the pictures.

Fig. 7^a is a fragmentary section of the film shown in Fig. 7.

Fig. 8 is a face view of the sound record side of a film but illustrating a plurality of records on one film.

Fig. 9 is a diagrammatic view of a bolometer as used by me for the purpose of reproducing sound vibrations.

Fig. 10 is a diagrammatic view of another form of sound reproducing mechanism.

Fig. 11 is a diagrammatic view of another form of sound reproducing mechanism.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

My invention is based upon the fact that infra-red rays are invisible but that these rays will affect a properly sensitized photographic film, and that these infra-red rays will affect various forms of electrical photographic receivers or sound transmitting de-

vices. Infra-red rays may be passed through an ordinary photographic film or the film of a moving picture without interfering with the proper projection of the picture by moving picture projecting apparatus. If a film is prepared, therefore, having on one side the ordinary photographic reproductions of pictures, and on the other side a phonographic sound record, capable of being reproduced only by infra-red rays, the sound record will not interfere with the passage of white light to and through the pictures and the presence of the pictures will not interfere with the passage of infra-red rays through the strip. On one side of the film or the strip, therefore, would be the ordinary picture record and on the other side would be a printed photographic record of sound, which latter record would be transparent to ordinary visible light but would more or less intercept the infra-red rays to produce variations in the projection of these rays, these variations being used to affect sound transmitting apparatus as will be later stated. Infra-red rays are below the ordinary visible spectrum. They are invisible to the naked eye and are very penetrating and are subject to the same optical laws as ordinary light.

Many substances will cut off visible light entirely but will let the infra-red rays pass nearly perfectly. Vulcanite, iodine, bromine and many other substances will permit the passage of these infra-red rays and more or less completely intercept the visible rays. Many substances such as alum, cupric chloride, water, oxygen, carbonic acid gas, very thin metallic silver and selenite will, on the contrary, permit the passage of visible or white light but will cut off more or less the passage of the infra-red rays.

Ordinary celluloid, of which material the moving picture film is usually constructed, is very transparent, both to the visible light rays and to the infra-red rays. By coating one side of a strip of celluloid, therefore, with a substance pervious to the white light rays and the other side with a translucent substance impervious to the infra-red rays, neither of the coatings would interfere with the passage of these rays and both records, the picture record and the sound record, could be combined on one film.

For the visible light picture record, there are many photographic prints (such as most any of the present forms of positive prints) which would interfere not at all with the passage of the infra-red rays, and it is therefore only necessary to provide a proper transparent coating on the strip or film which will intercept more or less the infra-red rays and yet will not affect the passage of the rays of white light.

One of the substances which would permit visible light to pass but which is opaque

or impervious to the infra-red rays is very thin metallic silver, but I do not wish to be limited to this as any material which would cut off, intercept, destroy or reflect back the infra-red rays would be equally suitable. This would be done by any substance having a high percentage of water of crystallization or a high percentage of water of constitution, a high percentage of selective reflection, or a high percentage of selective absorption. This infra-red rays intercepting substance is to be combined with gelatin, as for instance, the gelatin of the film, this gelatin acting as or being a medium for carrying said substance and this medium being subject to the photographic action for obtaining the necessary sound record.

In Figs. 5, 6, 7 and 7^a I show a portion of a film or strip of moving pictures designed to be used in my invention, both for the purpose of taking the moving pictures and for the purpose of reproducing them. Fig. 7^a is an enlarged sectional view, as it may be termed, and in this figure, 2 designates the body of the film, 3 a coating upon which the photographic picture print is made or taken, and 4 a coating of a substance which is capable of being acted upon photographically by ordinary light, and which will act as a medium to carry a substance which will act to intercept either partially or entirely infra-red rays to thereby cause the reproduction of sound by electrical transmission devices. Fig. 5 shows the face view of the film, as it may be termed, with moving pictures thereon. Fig. 6 shows the reverse side of the film and illustrates diagrammatically the sound record as photographed upon the film. Fig. 7 illustrates the compound record and shows that the sound record extends entirely across the film and therefore underlies the picture record.

While in Figs. 6 and 7 the sound record is shown as being made up of lighter or heavier lines or parallel striations extending entirely across the strip from one edge to the other, it is possible to have one record to extend from one marginal edge to the middle of the strip and another record to extend from the middle of the strip to the marginal edge. Such a record is shown in Fig. 8 wherein 4^a indicates one sound record and 4^b another sound record. The film shown in Fig. 8 is particularly adapted for use in a manner hereafter described.

It is, of course, necessary that the sound record and the picture record should be made simultaneously so that there will be complete synchronism between the sound record and the events shown by the pictures. In Figs. 2 and 3, 5 designates a double camera which will take moving pictures by means of the ordinary moving picture

camera mechanism and which is provided with a compartment 6 containing the photographic camera proper having a compartment 7 which contains what may be termed the sound camera mechanism for making a negative sound record.

Inasmuch as the mechanism used for taking the moving pictures is of the ordinary form, it requires no special description. This mechanism is actuated by means of the shaft 8 having the usual crank 9. The compartment 7 wherein the sound photographing mechanism is disposed, is preferably divided into an upper and a lower reel compartment in which are located respectively the reels 10 and 11. The film or strip 12 is fed down from the upper reel 10 over the rollers 13 and 14 to the lower reel, this lower reel being mounted upon the shaft 8 and being driven therefore synchronously with the picture apparatus. Immediately behind that portion of the film 12 between the rollers 13 and 14 is a diaphragm 15 having therein a narrow slit 16.

Behind the diaphragm 15 is disposed the tube 17 of a manometric flame apparatus. The flame 18 of this apparatus is disposed immediately in front of a mirror 19 whereby the rays of light are focused upon the film through the slit 16. When the film 12 is in position, there will therefore be a bright line of light thrown upon the face of the film. The manometric tube 17 extends down into a chamber 20 from which extends a gas pipe 21 leading to any suitable source of gas. Above the flame 18 is disposed a chimney 22 having baffle plates 23 therein, which chimney permits the outward passage of the products of combustion but prevents the flame 18 from being deflected by down drafts of air.

The front of the chamber 20 is provided with a diaphragm 24 and from this diaphragm there extends a megaphone 25 which as illustrated forms part of the camera body, this megaphone being of course enlarged at its forward or front end and gradually converging until it opens into the diaphragm chamber.

It is to be understood, of course, that the film used for taking the moving pictures is shifted intermittently by mechanism as ordinarily used in moving picture machines, while the film which is used for taking the sound record moves steadily and continuously. The film or strip 12 and the film or strip upon which the moving pictures are to be taken is the same as the ordinary negative moving picture films.

While I have illustrated a manometric flame for the purpose of photographically recording sound upon the film 12, I wish it understood that I may use a speaking arc in place of the manometric flame and that I do not wish to be limited to any particular

apparatus for making this photographic sound record as it is obvious that many different forms of apparatus may be used for this purpose. The manometric flame apparatus is shown purely for purposes of illustration.

With the manometric flame apparatus, the operation of the camera is evident. The camera is intended to be used precisely the same as an ordinary moving picture camera. While the picture is being taken, the film of the picture taking apparatus moves intermittently as before stated while the film of the sound apparatus moves steadily. The vibrations of the air caused by the sound waves being recorded, affect the diaphragm in a way well understood, and this in turn affects the manometric flame. The variations of pressure in the manometric tube 17 will cause variations in the intensity of the flame and consequently variations in the rays of light passing through the slit 16. As a consequence a photographic record of the sound will be made upon the sensitized strip, this sound record showing the variations in intensity of the light just in proportion to the amplitude of the sound vibrations. The sound record shows in the developed negative film as alternately light and dark striations which while having the appearance of great irregularity, are in reality exceedingly regular and harmonic, only changing their order with the change in the sound vibrations of which they are a record.

The record so produced and above referred to is the same form of record as is used in the photographone of Ruhmer and the reproduction of speech or sound from such a photophonographic record has been found to be astonishingly clear and quite strong, much clearer and purer than the reproduction of the ordinary wax cylinder phonograph. From a photographic sound record as above described, it is possible to secure many reproductions, each of which will reproduce the original sounds with equal exactitude.

It will be noted from what has gone before that so far the negative of the sound record and the negative of the picture record have been made upon separate strips or films. It is necessary, therefore, that these two negatives should be photographically printed upon one film or upon opposite sides thereof. In printing these records, the picture record would be printed as usual on one side of the moving picture film and fixed, the fixing solution however not being allowed to touch the other side of the film or strip. On the other side of the film there is a coating 4 of the substance before referred to which is impervious or opaque to infra-red rays, one such substance being very thin metallic silver. This substance which is opaque or impervious to the infra-red

rays is combined with gelatin or other suitable medium. After the picture side of the film has been printed, this coating 4 is sensitized by brushing on a solution having a proper proportion of bichromate of potassium or bichromate of ammonium. This sensitizes the gelatin and makes its sensitive to light for photographic action. This coating 4 could not be sensitized previously as in printing the pictures the sensitiveness of the coating 4 to light would be destroyed. The gelatin medium wherein the thin metallic silver for instance is carried, would simply act to hold this metallic silver or like substance and act as a transparent medium subject to the photographic action of light to thereby obtain a photographic record of the sound variations or sound record. The sound record which has been taken as previously described would be printed on the coating 4 of the film shown in Figs. 5 to 7^a by means of ordinary light, ordinary light affecting the now sensitized gelatin, and after printing in this manner the face 4 of the film is soaked in water which dissolves the gelatin that has not been acted on by the light. This soaking of the film will leave and take off horizontal stretches of transparent gelatin extending across the film, and therefore leave or cut off the element or substance carried in the gelatin and which acts to cut off the infra-red rays. The horizontal stretches or lines of gelatin left upon the side 4 of the film correspond to the sound record.

Thus on one side of the film 2 there would be a picture record to be reproduced by means of ordinary light, which light passes uninterruptedly through the clear transparent gelatin while on the other side would be the sound record formed by bands of gelatin corresponding to alternate light and dark lines on the negative and adapted to be reproduced by means of infra-red rays which would pass readily through the entire film except where purposely cut off by the substance impervious to red rays contained in the gelatin left upon the film. It is reiterated that the white light would be entirely unaffected by passage through the coating 4 and that the infra-red rays while being affected by the coating 4 would be unaffected by the coating 3 containing the picture record.

Generally speaking, for the reproduction of the picture record and the sound record, ordinary white light is passed through the picture record while infra-red rays (invisible to the eye) are passed through the sound record and fall upon suitable instruments to be hereafter described whereby these infra-red rays will cause the reproduction of sound vibrations. There are a number of instruments that are sensitive to infra-red rays. The tasimeter invented by Thomas A.

Edison will measure heat accurately down to the ten-thousandth part of one degree, but this instrument is probably too sluggish for the purpose of reproducing sound record. The selenium cell when sensitized by Abney's process is sensitive to infra-red rays and may be used for the purpose. I believe, however, that the bolometer is best adapted for the purpose for several reasons, but principally because the element upon which the light falls can be made more nearly to coincide with the small horizontal lines of the photographic sound record. The width of the horizontal lines of the sound record would be regulated according to the speed of the film. Thus for instance where the Urban-Smith natural color films are used, these horizontal lines would be wider on account of the greater operating speed of these natural color films.

In the reproducing apparatus such as is hereafter described, infra-red rays are projected against the film containing the sound record and the picture record by suitable prisms such as prisms of rock salt, fluorite or Jena glass and focused through a narrow slit onto the film and after passing through the film fall on the reproducing instrument such as the bolometer. Connected in series with the bolometer or through similar apparatus would be loud-speaking phones such as the auristophone, the Edison or the Dureret loud-speaking phones.

Moving pictures are reproduced by intermittently moving the film. It is therefore plain that it would be impossible to use this film during its intermittent motion or at the point through which the white light rays are projected for the purpose of reproducing the sound record, it being plain that the sound record must be reproduced as it was taken, namely, by a continuous movement of the film. I overcome this difficulty therefore by passing the infra-red rays through the film at a point on one side or the other of the point where the picture projecting rays are passing through, that is, at a point where the film is moving continuously and steadily.

An apparatus whereby the moving pictures may be projected and the sound record synchronously reproduced, is illustrated in Fig. 1. This figure shows an ordinary moving picture projecting apparatus comprising a table or base 26 supported in any suitable manner and supporting upon it the lamp housing 27 wherein there is disposed the ordinary right angle arc lamp 28 such as used in moving picture machines. Such a right angle arc is particularly adapted as a source of infra-red rays while supplying at the same time the ordinary white light for the pictures. The light is projected from the lamp housing in any usual or suitable manner onto the film 2. This film is

unrolled from an upper film reel and passes down through the usual moving picture projector 29. This mechanism contains means for intermittently shifting the film while the shutter of the mechanism is closed. Inasmuch as there are various types of this mechanism and it is thoroughly well known, it is not deemed advisable to describe the mechanism in detail.

The white light after passing through the film 2 at the point *a*, is projected onto a screen A in the usual manner. The film after it passes below the aperture plate of the moving picture machine no longer moves intermittently but is moved continuously and I have illustrated the film 2 as being passed around a series of rollers 30 and in front of the aperture of a selenium cell or like apparatus, this cell being designated 31. After passing in front of the aperture of the selenium cell the film 2 passes around a lower or receiving reel 32 which may be connected up with any suitable mechanism whereby the reel may be rotated continuously in a direction to wind up the reel 2 at a suitable rate of speed.

Disposed immediately below and in line with the meeting point between the carbons of the angular arc lamp 28, there are series of lenses 33. These lenses are preferably made of rock salt or fluorite. The infra-red rays passing through these lenses 33 are transmitted by means of prisms 33^a of Jena glass or other suitable material to the aperture of the selenium cell 31. A diaphragm 34 is so disposed as to cause these rays to fall in the form of an elongated narrow or transversely extending beam upon the face of the selenium cell 31. Preferably the lenses 32 and the prisms 33^a are contained within a casing or housing 35.

The selenium cell 31 is formed in any usual or suitable manner and requires no particular description as it is the ordinary form of cell except that preferably the cell is treated by Abney's process so as to make it extremely sensitive to the infra-red rays. Mounted behind the screen or in any suitable portion of the exhibition hall is a loud-speaking phone designated 36 in Fig. 1. This is a loud-speaking electric telephone and is connected in series by the wires 37 with the selenium cell 31.

The operation of the picture and sound reproducing apparatus illustrated in Fig. 1 is of course obvious. The pictures are reproduced in the usual manner, but after the strip or film has passed beyond the specific moving picture mechanism, the strip passes in front of the selenium cell and the transverse bands or lines of the sound record on the film will act to more or less intercept, absorb, reflect or otherwise stop or impede the passage of the infra-red rays. Where the infra-red rays fall with full force upon

the selenium cell, the cell will have a certain degree of electrical resistance. Where the infra-red rays are intercepted or their intensity changed in any manner, the electrical resistance of the selenium cell will vary correspondingly. There will therefore be a constant variation of the electrical resistance of the cell as the record film passes in front of the cell, and this continual variation of resistance will, in a manner well known, affect the mechanism of the telephone transmitter 36 and thereby cause vibrations of the air corresponding to the sound vibrations and the sound will be reproduced. All of the mechanism heretofore described is well known by itself. The photophone operates on the same principle as the sound reproducing mechanism heretofore described, but using ordinary white light.

Inasmuch as sound reproductions may be secured by a large variety of electrical apparatus, affected by variations of rays falling upon it, I do not wish to be limited to the use of a selenium cell or any other specific apparatus for the purpose of translating the photographic sound records into air vibrations as any other mechanism having the same general function may be substituted for the selenium cell.

For purposes of illustration, I have shown in Figs. 9 and 10 two other forms of mechanism adapted to translate the vibrations of light rays into sound. Fig. 9 illustrates the bolometer as used for this purpose. The bolometer will measure heat accurately down to the ten-millionth part of a degree. In Fig. 9 38 and 39 indicate two thin platinum strips forming the two arms of a Wheatstone bridge normally in perfect balance. The infra-red rays passing through the film 2 in the form of a thin beam fall on one of these arms or strips, namely the strip 39. This disturbs the balance of the bridge. This Wheatstone bridge is connected as illustrated in the diagram to a telephone transmitter 40 which is the transmitter of any one of the loud-speaking phones previously referred to. The current passing through this transmitter will vary in correspondence with the variations of the red rays falling upon the strip 39 and therefore the photographic sound record will be reproduced as air vibrations. The action of this instrument is virtually instantaneous in its operation and extremely sensitive.

Fig. 10 is a diagram of the Edison tasimeter which may also be used for the purpose of translating photographic sounds into sound vibrations. In this figure 41 illustrates a rod of vulcanite supported against a fixed abutment at one end and at the other end abutting against a movable disk 42. This disk bears in turn against a carbon button 43 disposed between the movable disk 42 and a fixed disk of metal 42^a. The

two metal disks 42 and 42^a are connected in circuit to a loud-speaking phone the current passing more or less between the disks 42 and 42^a through the carbon button as it is
 5 compressed. The variations in these red rays cause this vulcanite to contract and expand thus compressing the carbon button 43 between the metal pieces 42 and 42^a, causing variations in the current corresponding to
 10 the variations in the strength of the rays.

While I have illustrated three forms of electrical sound reproducing apparatus, I wish it understood that I may use other forms. Thus I might use a thermopile,
 15 especially a "Bi-Ag," a selenium cell made sensitive to infra-red rays by Abney's process, or any other delicate heat measuring instrument of like character.

While in Fig. 1 and Figs. 9 and 10 I have
 20 shown only one telephone transmitter, this transmitter being shown in Fig. 1 as being disposed behind the screen A, it will be understood that with the electrical sound reproducing apparatus I may use a plurality
 25 of telephone transmitters disposed at various portions of an amusement hall, not only behind the screen but at the sides of the hall. This is obviously of great advantage and is not possible where ordinary sound
 30 reproducing mechanism is used.

Such an arrangement of phones is illustrated in Fig. 4 wherein the picture and sound projecting apparatus is designated 47 and illustrated diagrammatically, the picture being received upon the screen 48. As
 35 illustrated, there are three loud-speaking telephone receivers 49 disposed behind the screen 48 and a plurality of loud-speaking transmitters disposed along the side of the hall and facing toward the audience. Thus the sounds reproduced may be distinctly
 40 heard by everybody in the audience. While I have illustrated in Fig. 4 all of the phones as being connected in one circuit and as being actuated by one selenium cell, bolometer
 45 or tasimeter, it is to be understood that when a film like that shown in Fig. 8 is used with two records placed in parallel position upon the film, a plurality of sets of sound reproducing apparatus is to be used. Thus
 50 with the film shown in Fig. 8 there will be two beams of infra-red rays projected through the film, each falling upon a separate bolometer, tasimeter or like apparatus,
 55 and each such reproducing mechanism being electrically connected to one of a series of sets of phonographic transmitters. By using the film shown in Fig. 8, a dialogue may be reproduced so that the sounds will issue
 60 from transmitters set at opposite sides of the hall or at opposite points behind the screen, thus causing the dialogue to seem more natural than if it apparently issues from one point only. It is obvious that a
 65 larger number of records could be placed

upon the same film and thus the sounds be caused to issue from a plurality of points behind the screen or around the hall.

The two main features of my invention upon which the invention is based are in the
 70 first place the provision of a film capable of receiving not only the photographic prints of the pictures to be projected, but also the photographic record of the sound and the use with these films of invisible rays
 75 for the purpose of reproducing the sound record. The other important and vital feature of my invention resides in the provision of means whereby the sound record may be taken from that portion of the film
 80 which is moving continuously while that part of the film through which the rays of white light are projected is moved intermittently.

In printing the sound record upon the
 85 strip or film 2, the sound record is started a sufficient distance beyond the starting point of the picture record so that at the instant that any one event is being projected on the line x , the sound record corresponding
 90 to this event is passing the axis of line Z. Inasmuch as in taking or making the picture record and the sound record two separate negative films or strips are used, it is entirely possible in printing these records
 95 upon the film 2^a to displace the sound record with relation to the picture record in the manner stated. While I have shown the axis Z of the infra-red beam as being about twelve inches below the axis x of the white
 100 light beam, I wish it understood that the two axes may be much nearer than this and that the drawing in Fig. 1 is purely illustrative in this regard, and further that I may pass the infra-red rays through the
 105 strip 2^a above the picture projecting mechanism and above the axis x .

While I have referred to the lenses and prisms for focusing and transmitting the invisible rays as being made of rock salt,
 110 or Jena glass, it is of course obvious that they may be made of other material such as fluorite, or that I may use metallic reflectors for deflecting the invisible rays along the line Z.
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By using a film having thereon a plurality of sound records, great naturalness could be secured as before stated by the fact that the transmitters translating the variations in the sound record into sound vibrations,
 120 could be located nearer to or farther from the inner side of the screen, or could be located on opposite lateral sides of the screen or stage so that the voices will apparently be projected in accordance with the positions
 125 of the actors in the moving picture. It is obvious also that in place of using a camera having a megaphone for transmitting sounds to the "speaking arc" or the manometric flame, sensitive microphone
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transmitters might be used at various portions of a stage upon which actors were acting a moving picture play, and that the vibrations of these microphones could be transmitted electrically to diaphragms placed within a camera to thereby transmit the sounds proceeding from the several microphones to the several flames or speaking arcs to be recorded in separate columns upon the sound record film.

In Fig. 11 I show diagrammatically a "Bi-Ag" thermopile as above referred to. As this thermopile is well-known an extended description is not necessary. The thermopile consists of a frame 50 having an opening at its middle and extending across this opening are a plurality of couples composed of connected bismuth and silver wires. These couples are joined by overlapping plates of tin, the junctions formed by the plates being covered with platinum black. The frame 50 with its couples of platinum and silver is supported inside of a casing 51 having a narrow slit through which the infra-red rays are projected upon the junction plates. The couples of silver and bismuth are connected in circuit with a receiver of a loud-speaking telephone in the manner heretofore described. A thermopile of this character is fully described in Bulletin No. 4 issued by the Bureau of Standards on Instruments and Methods of Radiometry. Therefore no extended description of the thermopile is necessary.

In case the talking picture machine before described is desired to be used in very large theaters where it would take a sound a perceptible time to travel the distance and where it would be possible to see the picture, therefore, before hearing its corresponding sound, the following arrangement could be made. After the system has been brought to a standard the instrument sensitive to the infra-red rays would always be just a certain distance from the lens or just a certain number of pictures below the lens. In a large theater, therefore, it would be only necessary to slightly advance the instrument, that is, move it a bit nearer to the lens, in which case the sound of a given event would slightly precede the picture but the sound would reach the observer at the same time that the picture was shown.

What I claim is:

1. A composite picture and sound recording film having on one side thereof a series of consecutive picture records and on the other side thereof a corresponding photographic sound record, the records being in overlapped relation.

2. A composite picture and sound recording film having on one side a series of consecutive pictures formed to permit the passage of invisible light rays without affecting said rays and on the other side thereof a

corresponding photographic sound record formed to permit the passage of visible rays but to intercept or affect the passage of invisible rays, the records being in overlapped relation.

3. A composite picture and sound recording film having in conjunction a series of consecutive pictures adapted to permit the passage of invisible light rays and having in conjunction therewith a corresponding photographic sound record adapted to permit the passage of invisible light rays, the records being in overlapped relation.

4. A composite picture and sound recording film having on one side a series of consecutive pictures adapted to permit or affect the passage of visible rays of white light and having on the other side and superposed upon the pictures a corresponding photographic sound record adapted to permit the free passage of rays of visible light but to intercept or affect the passage of rays of invisible light.

5. A composite picture and sound recording film having thereon a series of consecutive pictures adapted to affect or intercept the passage of rays of visible light and on the other side a corresponding photographic sound record adapted to intercept or affect the passage of infra-red rays, the records being in overlapped relation.

6. A composite picture and sound recording film for moving picture talking machines, of transparent material having on one side a picture record affecting rays of ordinary visible light but not affecting invisible light rays and on the other side a sound record permitting the passage of ordinary visible light but affecting or intercepting the passage of invisible light rays, the records being in overlapped relation.

7. A composite picture and sound recording film for moving picture talking machines having on one side a series of consecutive pictures intercepting or affecting the passage of white and visible light and having on the other side and extending entirely across the film a photographic sound record formed of a substance permitting the free passage of ordinary white light rays but affecting or intercepting the passage of invisible light rays.

8. A sound recording film having thereon a photographic medium and a medium adapted to cut off, intercept or otherwise affect rays of invisible light, the mediums being in overlapped relation.

9. A sound recording film having thereon a photographic sound record composed of a substance having a high percentage of water of crystallization or a high percentage of water of constitution, a high percentage of selective reflection or a high percentage of selective absorption.

10. A photographic sound record com-

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prising a transparent film having thereon a sensitive coating comprising a substance having a high percentage of water of crystallization or a high percentage of water of constitution, a high percentage of selective reflection or a high percentage of selective absorption, and a medium carrying said substance and subject to the photographic action whereby the sound records may be photographically obtained.

11. A sound reproducing and moving picture film of material transparent to visible and invisible light having on one side a picture record and on the other side a photographic sound record, the picture record being of material permitting the free passage of light rays beyond or below the visible spectrum but intercepting or affecting light rays proceeding within the visible spectrum, the sound record being formed of material permitting the free passage of visible light rays but affecting or intercepting the passage of rays beyond the visible light spectrum, the records being in overlapped relation.

12. The method of producing a motion picture and sounds corresponding to the action of the pictures which consists in passing rays of visible light and invisible light rays separately through a film, one side of said film being provided with photographic picture records acting to affect rays of visible light but not affecting invisible light rays, the other side of said film having superimposed thereon a photographic sound record of a substance which will affect invisible light rays but will not affect the visible light rays, causing the film to move at one point intermittently and at another point continuously, causing the rays of visible light to pass through the intermittently moving portion of the film and the invisible rays to pass through the steadily moving portion of the film, and translating the variations in the invisible light rays into sound vibrations.

13. A film for use in reproducing pictures and sound in synchronism having thereon a plurality of photographic records, each adapted to intercept or affect a certain class of light rays and permit rays of another class to pass unimpeded therethrough, each record intercepting or affecting that class of light rays which is permitted by the other record to pass freely, the records being in overlapped relation.

14. A film for use in reproducing pictures and sound in synchronism having thereon a

plurality of superimposed photographic records, each adapted to intercept or affect a certain class of light rays and permit rays of another class to pass unimpeded therethrough, each record intercepting or affecting that class of light rays which is permitted by the other record to pass freely, the records being in overlapped relation.

15. The method of reproducing a plurality of different records from a single moving film, consisting in moving a film across the paths of a plurality of different classes of light rays, said film having thereon a plurality of superposed records, each of said records affecting or being more or less opaque to the passage of a certain class of light rays but permitting the free passage of another class of light rays, the rays permitted to pass by one record being of another set or class from those permitted to pass by any other record.

16. A composite picture and sound recording film having on one side thereof a photographic record and on the other side a photographonic record, the records being overlapped.

17. A composite picture and sound recording film having opposed photographic and transparent photographonic records.

18. A composite picture and sound recording film having opposed surfaces sensitized for the individual impression thereon of photographic and photographonic records.

19. A negative film for the negative impression of picture and sound records having its opposed surfaces sensitized one for the photographic impression of a picture and the other sensitized for the photographonic impression of a related sound, the sensitized medium of the last-mentioned surface of the film being pervious to visible light rays.

20. A positive film for the reproduction of picture and sound records having upon one surface a positive picture record pervious to invisible light rays and provided upon its other surface and directly opposite the picture record with a positive sound record pervious to visible light rays and more or less impervious to invisible light rays.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD M. CRAIG. [L. s.]

Witnesses:

G. M. BOOK,

G. H. SHINER.

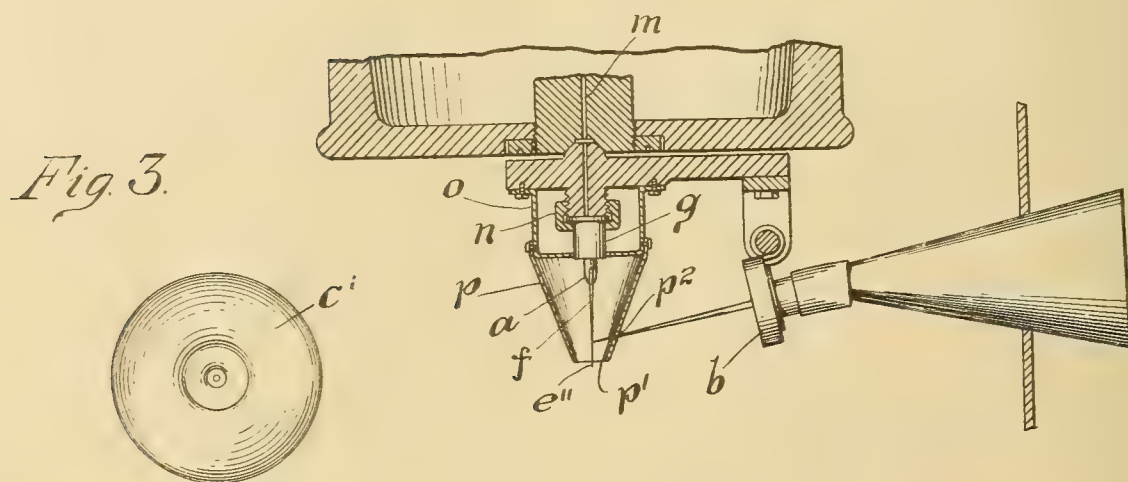
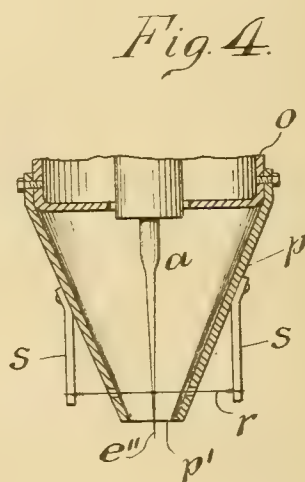
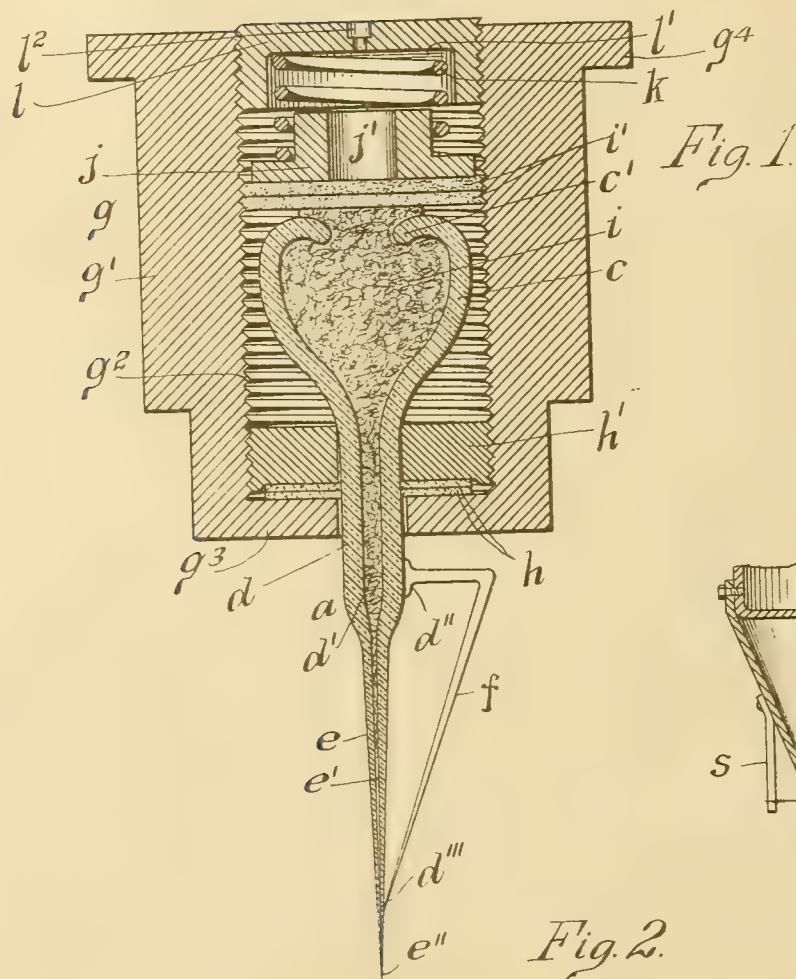


STYLUS

1,260,365 ----- R. L. Gibson,
Filed Dec. 29, 1913,
Patented Mar. 26, 1918.

Patented Mar. 26, 1918.

1,260,365.



WITNESSES:

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STYLUS.

1,260,365.

Specification of Letters Patent. Patented Mar. 26, 1918.

Application filed December 29, 1913. Serial No. 809,186.

To all whom it may concern:

Be it known that I, ROBERT L. GIBSON, a citizen of the United States, and resident of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Styli, of which the following is a specification.

The present invention relates to a stylus for sound recording machines adapted to produce a sound record or phonogram in the form of a raised ridge or rib which may be used as a mold (directly or indirectly) to form on a plate or disk of suitable material a complementary groove adapted for the reproduction of sound in the usual sound reproducing machines.

The stylus is particularly adapted for use in connection with the apparatus shown in my application 809,188, filed December 29th, 1913, for carrying out the process described in my application 809,187, filed December 29th, 1913.

The stylus consists of a hollow tube having a vibratory portion adapted to vibrate under the impulse of sound waves and terminating in a very small orifice. When the stylus is used for the process of application 809,187, above referred to, the orifice is of microscopic size, smaller than a capillary duct, so that the material ejected through it is an extremely fine thread or stream much smaller in cross section than the ridge or rib which is formed, the latter being produced by the building up of the material upon itself by ejecting the fluid through the stylus much more rapidly than the surface upon which it is deposited moves. When it is understood that in practice the finished phonautographic ridge is preferably only .005 of an inch in width and .0025 of an inch in height and that the stream ejected through the stylus has a cross section much less than such a ridge, the microscopic dimensions of the orifice will be appreciated.

Owing to the minuteness of the orifice it is necessary that the material which is ejected through it should be thoroughly strained as even the most minute particle of solid matter would clog the orifice and render the stylus inoperative. To obviate this I provide the stylus with filtering material and as the material is forced through the stylus under very great pressure this filtering material is very highly compressed.

I have found that a stylus suitable to the purpose can best be formed of glass which can be drawn to a fine vibratory end terminating in an orifice of microscopic dimensions while the upper part may be left sufficiently large to contain the filtering material, and I prefer that construction.

The invention also embraces the combination with the stylus proper of the nipple or means to which it is secured and by which it may be attached to the machine.

Further objects and advantages are set forth hereinafter when referring to the accompanying drawings, in which Figure 1 is an enlarged vertical section of the stylus and its support showing the preferred construction; Fig. 2 is a side elevation with parts in section showing the stylus attached to the apparatus in which the record making material is contained and connected with a recording sound box; Fig. 3 is a top view of the stylus; and Fig. 4 is a detail view showing a modified form of the means for bracing the vibratory portion of the stylus.

The hollow stylus *a* is provided with a fine tubular vibratory portion *e* operated by the impulses transmitted to it by the vibrations imparted by sound waves to the diaphragm of a recording instrument *b*.

The stylus is preferably made of a blown and drawn glass tube shaped in the form shown in Fig. 1, comprising an enlarged chamber or bulbous portion *c* at the top partially closed by the inwardly directed flange *c'*, an intermediate portion *d* with substantially parallel sides *d'*, and a fine vibratory portion *e* gradually tapering and containing an axial bore *e'* of decreasing diameter terminating in the orifice *e''*. To protect this slender portion *e* as much as possible and to prevent it from vibrating in any plane other than that in which it is moved by the impulses from the sound box, I find it of advantage to employ a brace *f* preferably made of an angular tapered piece of glass welded at its larger end *d''* to the sides *d'* of the portion *d* and at its smaller end *d'''* near the point of the fine vibratory portion *e*.

A support or thimble *g* for the stylus is preferably shaped substantially as shown in Fig. 1 and comprises a metal cylindrical portion *g'* preferably made of steel and provided with internal threads *g²* and partially

closed at its lower end by an inwardly directed flange g^3 , having a central opening slightly larger than the outside diameter of the portion d of the stylus. Fitting closely
 5 about said section d are one or more washers h , preferably of asbestos, and above the washers is a ferrule h' , preferably of lead or other relatively soft metal, or metal alloy, apertured to receive and support the stylus
 10 while its periphery is threaded for engagement with the threads g^2 , whereby the ferrule is screwed down to firmly secure the washers h in place.

The stylus is filled with any suitable filtering material i , such as cotton or other fibrous substance, under suitable compression, and this is held in the stylus and the stylus in place by porous washers i' of felt or the like, which in turn are firmly pressed
 20 downwardly by a cap j provided with a central aperture j' . The cap is forced downward by a spring k tensioned by a plug l recessed at l' and screwed into the top of the thimble g . The plug l is provided with
 25 a central aperture l^2 , which connects with the passage m leading from a source of supply (not shown) of the record making material. The thimble g is removably secured to the supporting head or plate by a coupling n having a central aperture and embracing the flange g^4 on the upper edge of said thimble.

To protect said coupling and thimble, a substantially cylindrical shield o is provided,
 35 which is secured to the supporting head or plate with which the thimble is coupled. To surround and directly protect said stylus, an inverted conical shield p is secured to the outside of the shield o and this is
 40 provided with a central aperture p' through which the stylus extends, while a second aperture p^2 in one side permits a direct connection between the stylus and the diaphragm of the recording instrument b , said
 45 connection extending in a plane at right angles to the plane of the brace f .

While the invention is not limited to the process of forming and applying the stylus, I consider the following to be the simplest
 50 and most convenient manner of carrying out the same: The glass tube is first blown to produce the bulbous end c ; after the tube is filled with the cotton or other filtering material i , it is introduced into the thimble g
 55 with the shank projecting through the ferrule h' and washers h . The spring k with the plug l , cap j and the washers i' are then applied and the plug l is screwed down to fasten the glass tube securely in place. The
 60 lower end of the tube is then heated and drawn to form the fine vibratory portion e . As the pressure at the top is applied through the cap j and the washers i' , and the contact of the shank at the swelling of the
 65 bulbous end is with the soft lead ferrule h' ,

the tube may be firmly secured without fracture, and when it is thus secured, the lower end e may be drawn in the manner described to an exceedingly fine point.

A modified form of support and guide for
 70 the vibratory portion of the stylus is shown in Fig. 4, in which the brace f is omitted and in place thereof is provided a wire or filament r , surrounding said stylus and extending in opposite directions through the
 75 shield p and secured at its ends to angular braces s upon the outside of the shield.

As this invention relates only to the stylus and its support, it is unnecessary to describe either the recording device, or disk
 80 actuating mechanism, or that portion of the apparatus, with which the stylus is especially adapted to be employed which contains the record making material or forces the same through the stylus.

While a preferred form of the device has been described, the invention is not limited to the exact details shown, it being possible to make many changes in the device while still embodying all of the essential features
 90 or elements characteristic of the invention.

What I claim is as follows:

1. A stylus for a sound recording machine composed of a glass tube drawn to an exceedingly fine point presenting a micro-
 95 scopic discharge orifice.

2. A stylus for a sound recording machine having a microscopic discharge orifice and adapted to eject, under pressure, a readily solidifying fluid material, said orifice being
 100 of a diameter much less than .005 inch and therefore adapted, when vibrated under the influence of sound waves and properly disposed relatively to a surface traveling at a substantially slower speed than the speed of
 105 ejection of said material, to build upon said surface a sound record in distinct relief and of a width substantially greater than the diameter of said discharge orifice.

3. A stylus for a sound recording machine
 110 consisting of a tube having a capillary bore terminating in a microscopic discharge orifice of substantially less diameter than the average diameter of the capillary bore.

4. A stylus for a sound recording machine
 115 consisting of a tube having a capillary bore of very gradual taper and terminating in a microscopic discharge orifice.

5. A stylus for a sound recording machine consisting of an integral tubular body hav-
 120 ing a plurality of decreasing cross-sectional areas, the smallest of which has a capillary bore terminating in a microscopic discharge orifice.

6. A stylus for a sound recording machine
 125 consisting of an integral tubular body having a plurality of decreasing cross-sectional areas, the smallest of which has a capillary bore of very gradual taper terminating in a microscopic discharge orifice.

7. A stylus for a sound recording machine consisting of a hollow tube and a thimble inclosing the upper end of the tube having an orifice inclosing the tube between its upper and lower end portions.

8. A stylus provided with an enlarged bulbous portion leading through an intermediate section into a tapering bore having a microscopic outlet.

9. A stylus provided with an enlarged bulbous portion leading, through an intermediate and smaller section with substantially parallel sides, into a tapering bore having a microscopic outlet.

10. A stylus provided with an enlarged bulbous portion leading through an intermediate section into a tapering bore having a microscopic outlet, said bulbous and intermediate sections being provided with filtering material.

11. A stylus comprising an integral structure provided with a bulbous portion containing filtering material, and terminating in a bore having a microscopic outlet.

12. The combination of a hollow tapering stylus, a thimble having an outlet through which said stylus extends, and cushion means operative to support said stylus out of contact with said thimble.

13. The combination of a hollow tapering stylus, a thimble having an outlet through which said stylus extends, adjustable means to detachably secure said stylus in said thimble, and cushion means operative to support said stylus out of contact with said thimble and adjustable securing means.

14. The combination of a hollow tapering stylus provided with filtering material, a thimble having an outlet through which said stylus extends, means to secure said stylus in said thimble, cushion means operative to support said stylus out of contact with said thimble, and filtering means between said stylus and said means for securing it in the thimble.

15. A vibratory stylus provided with a capillary bore and means to brace said stylus against vibration in one direction.

16. A vibratory stylus provided with a capillary bore and means to brace said stylus against vibration in one direction consisting

of a brace-piece extending from the shank of the stylus to the point.

17. A stylus composed of glass having a capillary bore and drawn to a fine point, and means to brace said stylus against vibration in one direction consisting of a glass brace piece extending from the shank of the stylus to the point.

18. A stylus for a sound recording machine formed of an integral body having at its upper end a relatively large chamber open above and below and the lower part continuing in a relatively small and gradually tapering bore terminating in a microscopic orifice, the large chamber filled with a tightly fitting filtering material.

19. A stylus for a sound recording machine consisting of a hollow vibratory tube having an enlarged hollow portion at one end and a long tapered portion terminating in a microscopic orifice at the other end, and compressed filtering material in the enlarged hollow portion.

20. A stylus for a sound recording machine consisting of a hollow vibratory tube terminating in a microscopic orifice and having an enlarged bulbous portion at the top containing a filtering material.

21. A stylus for a sound recording machine consisting of a hollow vibratory tube enlarged at the top and having a capillary bore terminating in a microscopic orifice and containing compressed filtering material in said enlargement and capillary bore.

22. A stylus for a sound recording machine consisting of an integral body in the form of a tube in which the portion adjacent to one end is of large diameter and relatively non-vibrating and the portion adjacent to the other end is of small diameter terminating in a microscopic orifice and capable of freely vibrating, combined with means for supporting the portion of large diameter and means for vibrating the portion of small diameter having the microscopic orifice.

In testimony of which invention I hereunto set my hand.

ROBERT L. GIBSON.

Witnesses:

R. M. KELLY,

ERNEST HOWARD HUNTER.

PHONOGRAPH REPRODUCER AND RECORD THEREFOR.

1,260,586 ----- C. D. Smith,
Filed Nov. 6, 1916,
Patented Mar. 26, 1918.

C. D. SMITH.
 PHONOGRAPH REPRODUCER AND RECORD THEREFOR.
 APPLICATION FILED NOV. 6, 1916.

1,260,586.

Patented Mar. 26, 1918.

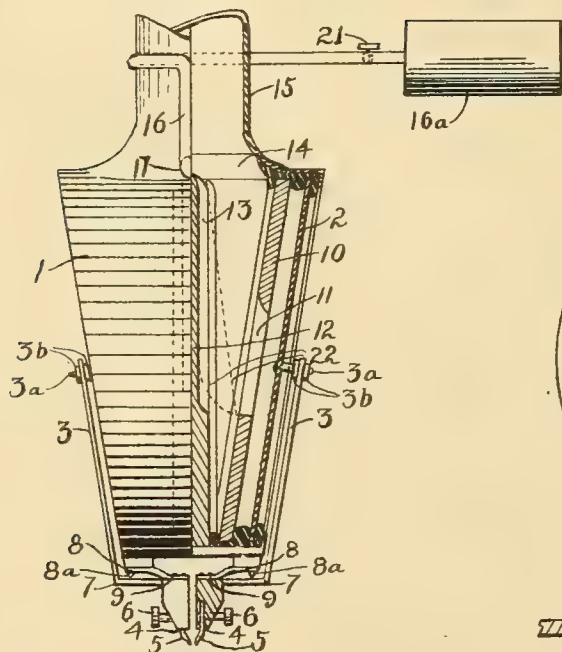


FIGURE 2

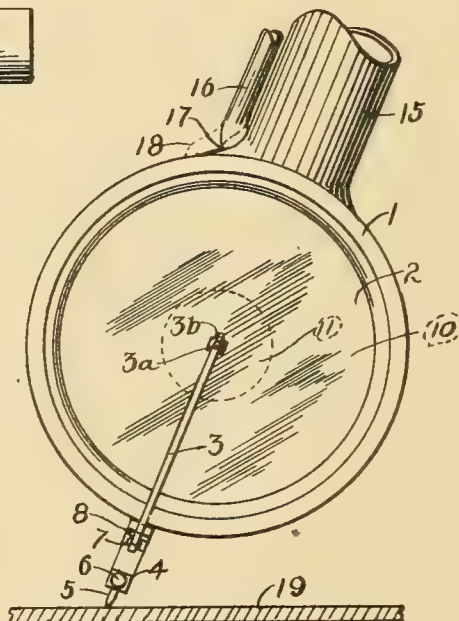


FIGURE 1

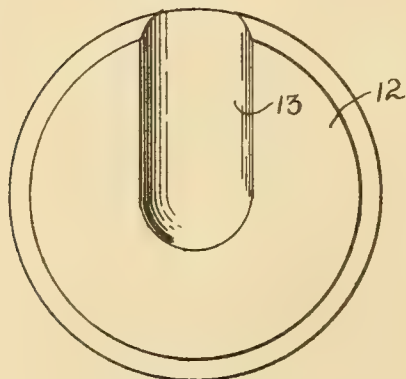


FIGURE 3

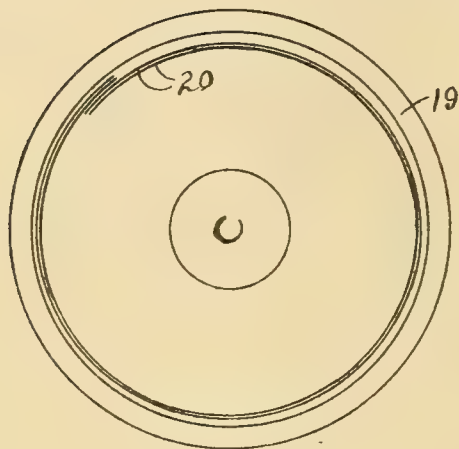


FIGURE 4

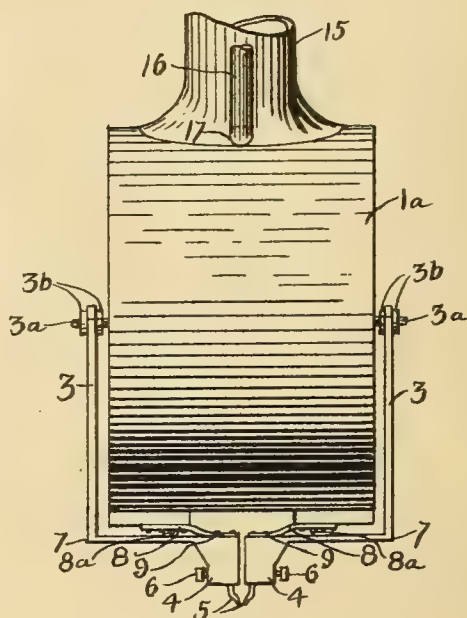


FIGURE 5

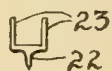


FIGURE 6

INVENTOR
Charles D. Smith
 BY *John A. Raimith*
 HIS ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES D. SMITH, OF SAN JOSE, CALIFORNIA, ASSIGNOR OF ONE-HALF TO HENRY T. WELCH, OF SAN JOSE, CALIFORNIA.

PHONOGRAPH-REPRODUCER AND RECORD THEREFOR.

1,260,586.

Specification of Letters Patent.

Patented Mar. 26, 1918.

Application filed November 6, 1916. Serial No. 129,782.

To all whom it may concern:

Be it known that I, CHARLES D. SMITH, a citizen of the United States, and resident of San Jose, in the county of Santa Clara and State of California, have invented certain new and useful Improvements in Phonograph-Reproducers and Records Therefor, of which the following is a specification.

My invention relates to a phonograph reproducer and the record therefor, and the object of my invention is to provide a phonograph reproducer and record that will produce sounds of greater volume and carrying power than those now in general use. Another object is to provide a mechanism by which imperfections in the recording and reproducing of one half of the device may be rendered less noticeable by the other half of the device.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, construction, combination and relative arrangement of parts as hereinafter described, shown in the drawings and finally pointed out in the claims.

In the drawings;—

Figure 1 is a side elevation of my invention, a part of the record being broken away.

Fig. 2 is an edgewise view of my invention, one half being in section.

Fig. 3 is a side elevation of the sound diverting plate.

Fig. 4 is a plan view of the record with a portion of the parallel grooves omitted.

Fig. 5 illustrates a sound box embodying my invention in which the diaphragms are placed parallel to each other.

Fig. 6 is a detail elevation of a needle with a double, shank adapted for use in my improved reproducer.

Similar characters of reference refer to similar parts throughout the several views.

Referring now more particularly to the drawings, 1 indicates a circular V shaped sound box having a diaphragm 2 fitted in each side thereof in the manner usual in the construction of such devices. A vibrating stem 3 is connected at one end to each diaphragm by means of a threaded pin 3^a securely fastened to said diaphragm and passing through the end of said stem and held securely to said stem by nuts 3^b screwed onto pin 3^a, one on each side of said stem 3. The other end of stem 3 is fitted with

a socket 4 adapted to receive needle 5 which is held in position by set screw 6. The upper portion of stem 3 is bent so as to parallel the surface of diaphragm 2 but is bent inwardly toward the lower end thereof as at 7 to form an arm lying substantially perpendicular to the diametrical median plane of sound box 1 and by which it is secured to spring 8 by screws 9, spring 8 being secured to the lowermost portion of the circumference of sound box 1. A chisel edged fulcrum may be introduced at 8^a if desired. The lowermost portion of stem 3 in which is formed socket 4 is formed and adjusted to lie in a plane substantially parallel with a diametrical plane passing through said drum midway between said diaphragms 2. At 10 is shown a sound plate provided with an orifice 11. At 12 is shown a sound diverting plate circular in form and completely separating the two halves of sound box 1. Plate 12 is hollowed out on each side from a point below the center thereof to the outer circumference as shown at 13. At 14 is provided an opening in the upper surface of sound box 1 to which is attached sound conveyer 15. A second and smaller tube 16 is connected to the lower end of conveyer 15 as indicated at 17, or directly to any point on the circumference of sound box 1 as indicated in dotted lines at 18. At 19 I have shown a double cut disk record adapted to be operated upon simultaneously by needles 5—5. Each of the two grooves 20 is an exact, but reversed, counterpart of the other, consequently when the device is in operation the two diaphragms 2 are acted upon simultaneously and receive exactly the same vibration but in opposite directions.

The sound waves thrown off by diaphragms 2 pass through orifices 11 and are diverted upwardly by plate 12 until they join and augment each other at opening 14 and pass through sound conveyer 15 to the point of discharge. The volume of sound emitted by a double reproducer of this kind is practically double that of the single reproducer and therefore is desirable for use in large halls for concerts, entertainments, etc. In order to increase the carrying qualities of said augmented sounds air under pressure and in desired quantities is forced through tube 16 into sound box 1 or sound conveyer 15 from any suitable source of supply as

indicated at 16^a, the quantity being governed by the pressure applied thereto and by valve 21.

The two nuts 3^b permit a very accurate
5 adjustment of stem 3 so as to provide the proper tension of diaphragm 2 and the precise positioning of needles 5. The device hereinbefore described is designed for use with a record having grooves provided with
10 a laterally undulatory surface, but it is understood that changes may be made to adapt the invention for use on a record provided with grooves having a vertically undulatory surface.

15 In operating my improved phonograph, if one of grooves 20 is imperfect in any respect or at any point or points, and as a consequence one of said diaphragms 2 transmits an imperfect vibration and as a result
20 an imperfect sound wave reaches sound conveyer 15, then this wave is met by a perfect wave transmitted by the opposite diaphragm and a more perfect wave is consequently discharged from conveyer 15, since a perfect
25 wave from one diaphragm would naturally render an imperfect wave from the other diaphragm less noticeable. As a result of this dual construction an even, smooth succession of sounds of great volume are dis-
30 charged by sound conveyer 15.

It is my desire to cover broadly a double sound box and record of the character described and either a single or double sound box provided with an air inlet as described,
35 therefore I do not wish to confine myself to the specific mechanism herein shown and described but to make such alterations and changes in form, construction and operation as may be necessary to meet exigencies of
40 practical application and manufacture and within the scope of the appended claims. For instance, plate 13 may be made in the form indicated in dotted lines at 22 and may form a part of sound plate 10, or the dia-
45 phragms 2 may be placed parallel to each other as indicated in Fig. 5 in which the circular sound box is indicated by 1^a.

Having thus described my invention, what I claim as new and desire to secure by Let-
50 ters Patent, is:—

1. In a phonograph, a reproducer comprising a pair of opposed, coöperating sound

reproducers having a sound conveyer com-
mon to both of them and independently
operating means for producing simultane- 55
ous and equal opposed vibrations in each of them.

2. In a phonograph, a reproducer comprising a pair of opposed, coöperating sound
reproducers having a sound conveyer com- 60
mon to both of them and means for producing simultaneous and equal opposed vibrations in each of them, said means comprising a revolving record having a pair of re-
versed duplicate sound record grooves 65
formed therein, each of said grooves being adapted to coöperate with one of said pair of opposed coöperating sound reproducers.

3. In a phonograph, the combination with a record having a pair of reversed duplicate
sound record grooves formed therein, of a
reproducer provided with a pair of op- 70
posed coöperating diaphragms each diaphragm having a stylus operatively at-
tached thereto, and each stylus being inde- 75
pendently mounted on said reproducer and adapted to operate in one of said grooves.

4. A phonograph reproducer comprising a sound box having a sound conveyer at-
tached thereto, a sound diverting plate posi- 80
tioned in the diametrical median plane thereof, a pair of opposed coöperating dia-
phragms positioned therein, one on each
side of said sound diverting plate, and in-
dependently operating means for imparting 85
simultaneous and equal opposed vibrations to said diaphragms.

5. In a phonograph, a reproducer comprising a pair of opposed coöperating sound
reproducers having a sound conveyer com- 90
mon to both of them, and independently operating means adjustably connected to
said opposed coöperating sound reproducers for producing simultaneous and equal op-
posed sound vibrations in each of them. 95

6. The combination of a double phono-
graph reproducer and a record having a
pair of reversed duplicate sound record
grooves formed therein.

In testimony whereof I have hereunto af- 100
fixed my signature this 27th day of Octo-
ber, 1916.

CHARLES D. SMITH.

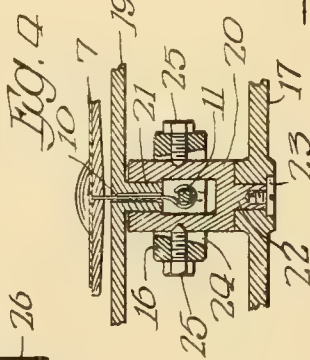
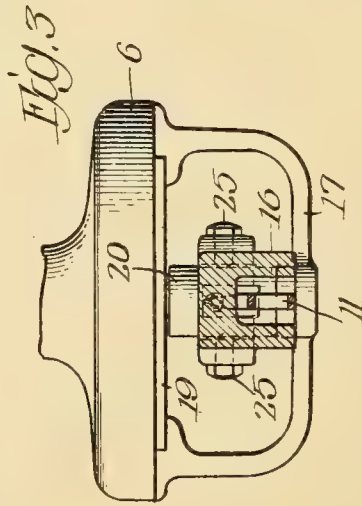
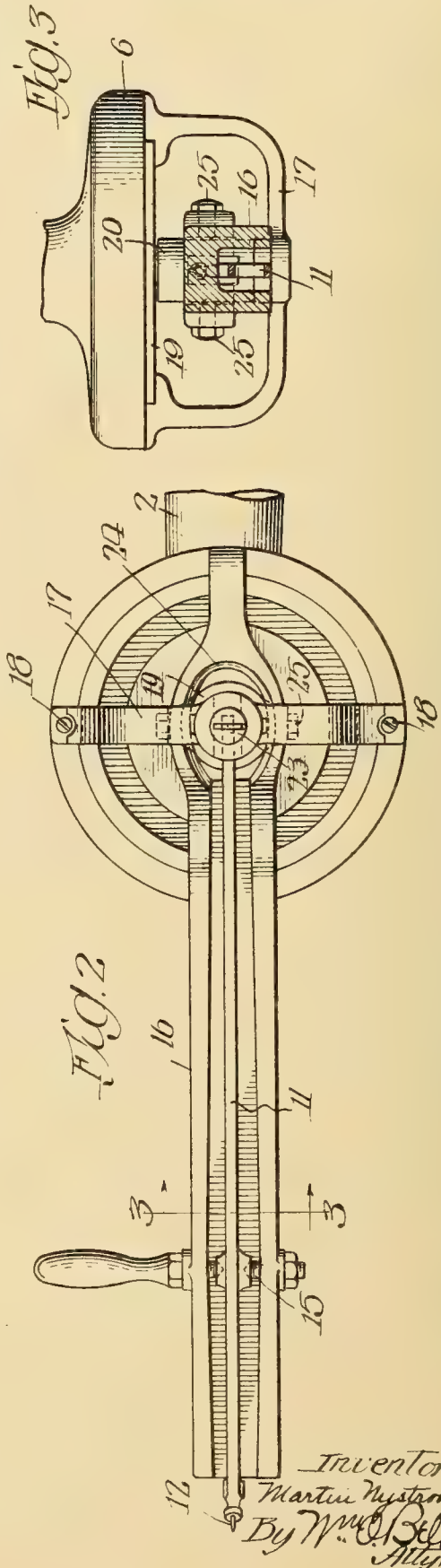
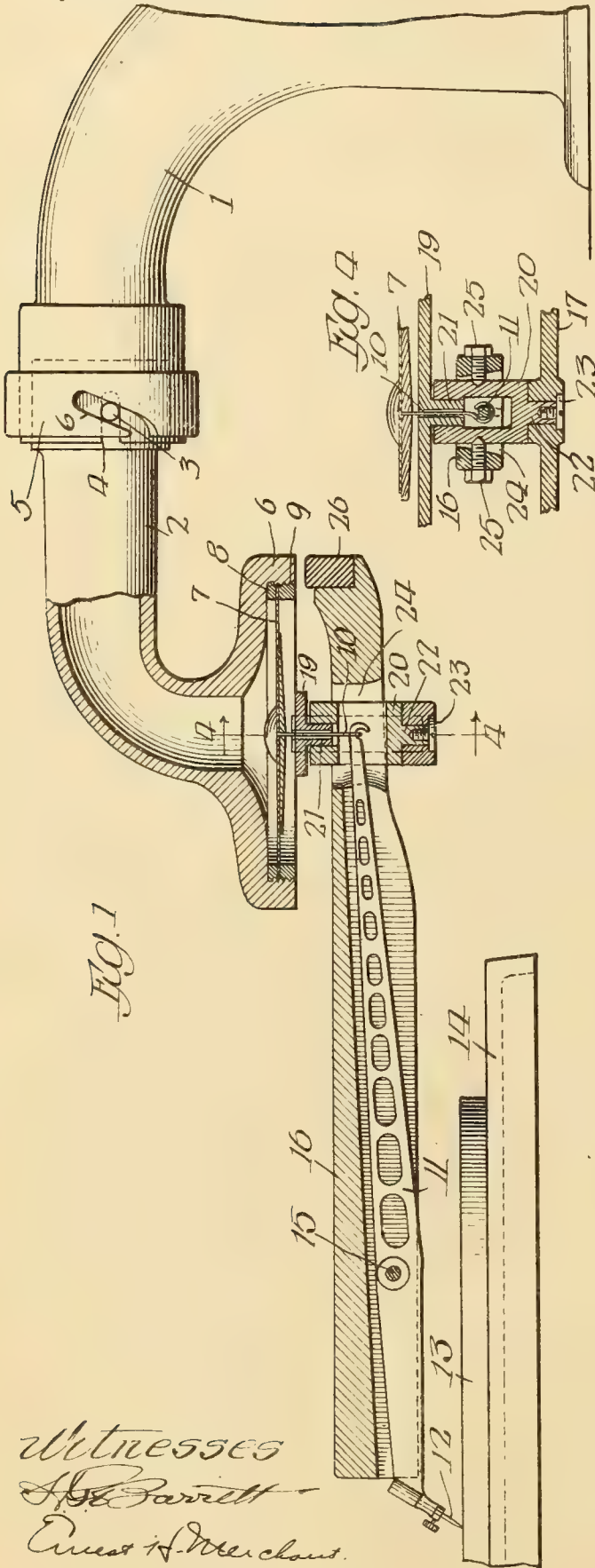
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

TALKING MACHINES.

1,260,790 ----- M. Nystrom,
Filed June 17, 1916,
Patented Mar. 26, 1918.

1,260,790.

Patented Mar. 26, 1918.



Witnesses
J. B. Barrett
Ernest H. Merchant.

Inventor
Martin Nystrom
By Wm. C. Bell
Atty.

UNITED STATES PATENT OFFICE.

MARTIN NYSTROM, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

TALKING-MACHINE.

1,260,790.

Specification of Letters Patent.

Patented Mar. 26, 1918.

Application filed June 17, 1916. Serial No. 104,144.

To all whom it may concern:

Be it known that I, MARTIN NYSTROM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

This invention relates in general to talking machines and more particularly to sound reproducing means of novel construction.

It is an object of my invention to provide a sound reproducing means of simple and relatively inexpensive character in which the diaphragm bears a normally fixed relation to the record table.

A further object of my invention is the provision of sound reproducing means in which the vibrations set up by the record are transferred to the diaphragm in greatly amplified form.

Further objects and advantages of my invention will be apparent as it is better understood by reference to the following specification when read in connection with the accompanying drawing, illustrating the preferred embodiment thereof, in which—

Figure 1 is a side elevation, partially in section, of a sound reproducing means according to my invention;

Fig. 2 is a bottom plan view of a portion of the structure illustrated in Fig. 1;

Fig. 3 is a transverse section on the line 3—3 of Fig. 2, and

Fig. 4 is a transverse section on the line 4—4 of Fig. 1.

Referring to the drawing, 1 represents a stationary sound conducting tube which may be connected in any suitable manner to the sound-amplifying device (not shown). The forwardly projecting section 2 of the sound-conducting tube 1 is connected thereto by a slip-joint, a pin 3 on the section 2 being arranged to engage a slot 4 on the tube 1. A collar 5 having a slot 6 therein locks the pin 3 and secures the parts in assembled relation.

A sound box 6 is preferably formed integral with the section 2 and is provided with a diaphragm 7 held in position by threaded rings 8 and 9. A pin 10 is secured to and depends from the diaphragm 7 and is loosely connected to a lever 11 carrying the stylus 12 which coöperates with the record 13 on the record table 14.

The lever 11 is pivoted at 15 on a weighted arm 16 supported to move in vertical and horizontal planes. The support for the arm 16 comprises a yoke 17 secured by screws 18 to the sound box 6. A cross bar 19 connects the arms of the yoke 17 adjacent the diaphragm 7. A member 20 is pivotally mounted on a depending portion 21 of the cross bar 19 and in an opening 22 in the bottom of the yoke 17 and is held in assembled relation with the yoke by a screw 23. The arm 16 is provided with an opening 24 which surrounds the member 20 and screws 25 are disposed through the arm 16 on either side of the opening 24 and engage the member 20. It will be readily understood, therefore, that the arm 16 has a universal movement with respect to the sound box 6 and that, therefore, the stylus 12 is capable of movement transversely of the record 13 under the guidance of the grooves therein and of vertical movement to allow the stylus to be placed on the record as well as to allow for inequalities in the surface thereof while the sound box 6 remains stationary. An insert 26 of rubber or other suitable material is secured to the end of the lever 16 and engages the sound box 6 when the stylus 12 is not supported by a record.

From the foregoing description it will be apparent that I have devised sound-reproducing means involving a construction novel in the art and having various material advantages among which is the possibility of calculating to a nicety the pressure exerted by the arm 16 on the stylus 12, and the delivery of the vibrations set up in the stylus, to the diaphragm in greatly amplified form. Moreover, my construction reduces the number of necessary joints to a minimum and improves the reproductive properties of the apparatus materially.

It will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing any of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a talking machine, the combination of a stationary sound conducting means, a horizontally arranged sound box rigidly mounted thereon, a relatively heavy horizontally disposed arm supported at one end on

said sound box and capable of swinging movement in horizontal and vertical planes, a relatively light lever extending longitudinally of and pivoted on said arm adjacent the free end thereof, a stylus on the outer end of said lever, and a pin secured to the diaphragm of said sound box and loosely connected to the inner end of said lever.

2. In a talking machine, the combination of a stationary sound conducting means, a horizontally arranged sound box rigidly supported thereon, a yoke on said sound box, a member pivotally mounted in said yoke, a relatively heavy horizontally disposed arm pivotally supported at one end on said member and capable of swinging movement in horizontal and vertical planes, a relatively light lever extending longitudinally of and pivoted on said arm adjacent the free end thereof, a stylus on the outer

end of said lever, and a pin secured to the diaphragm of said sound box and loosely connected to the inner end of said lever.

3. In a talking machine, the combination of a stationary sound conducting means, a horizontally arranged sound box rigidly mounted thereon, a lever loosely connected at one end with the diaphragm of the sound box and adapted to carry a stylus at its other end, an arm extending above the lever substantially from the stylus end of said lever beyond the other end thereof and pivotally engaged with said lever at a point removed from its stylus and pivotally engaged with the sound box adjacent the connection of the lever and sound box.

MARTIN NYSTROM.

Witnesses:

H. F. DAVENPORT,

JOHN GREASLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE LIGHTER,

1,260,821 ---- G. J. Sellmeyer & L. H. Britton,
Filed Mar. 22, 1917,
Patented Mar. 26, 1918.

G. J. SELLMAYER & L. H. BRITTON.

TALKING MACHINE LIGHTER.

APPLICATION FILED MAR. 22, 1917.

1,260,821.

Patented Mar. 26, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

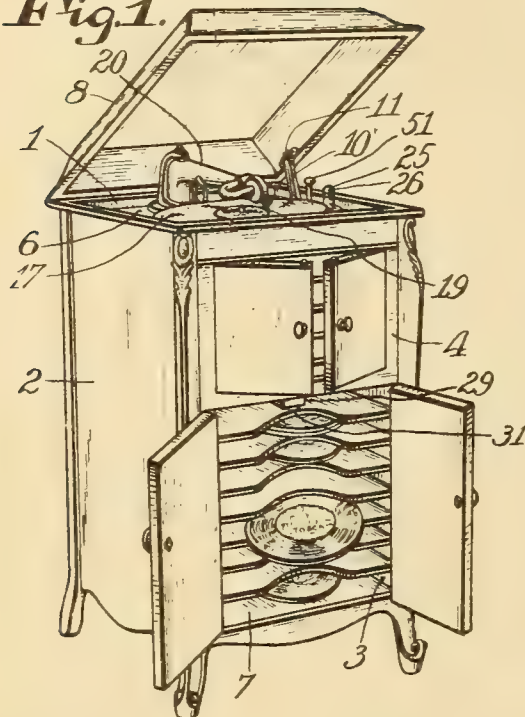


Fig. 2.

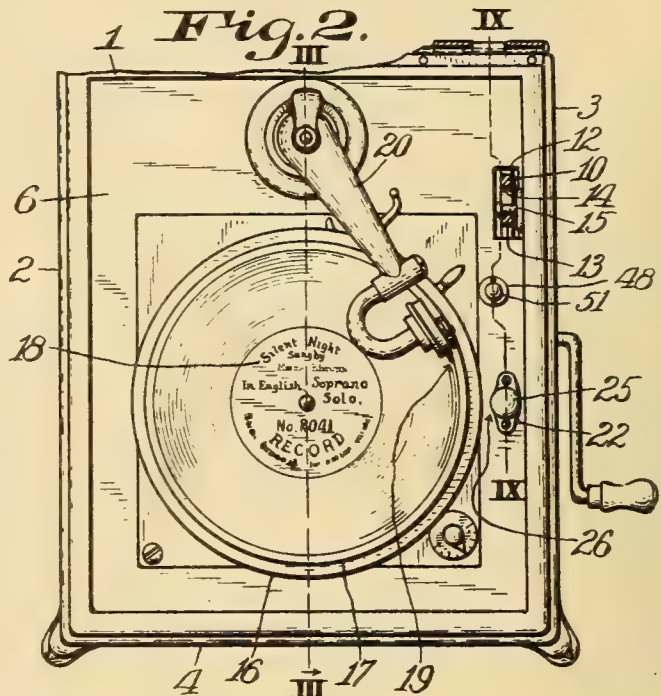


Fig. 3.

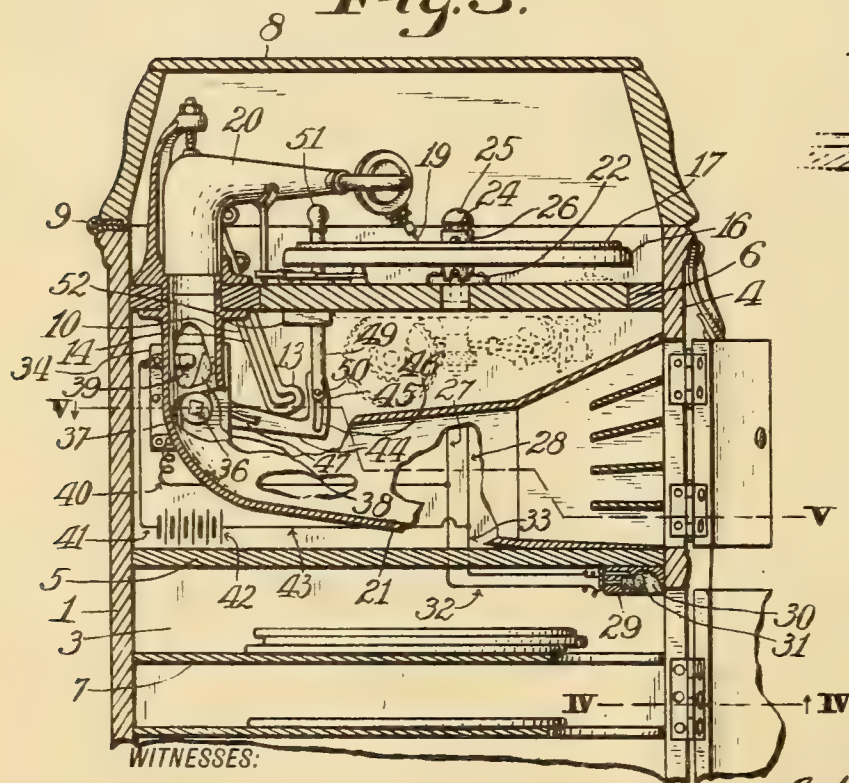
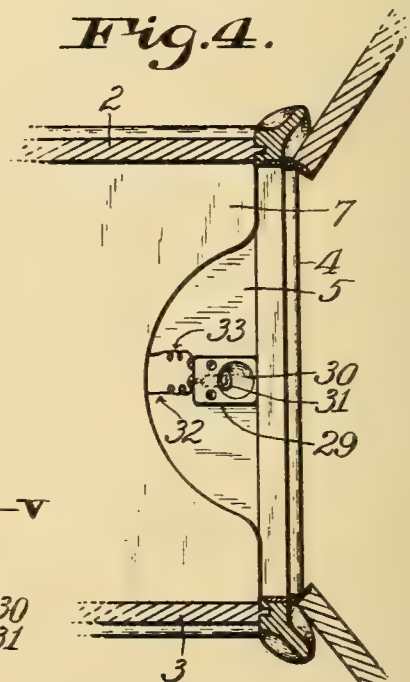


Fig. 4.



WITNESSES:

J. H. Gardner.
Myrtle M. Coy.

INVENTORS:

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Loyal H. Britton,
By E. T. Silvius,
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G. J. SELLMAYER & L. H. BRITTON.
TALKING MACHINE LIGHTER.
APPLICATION FILED MAR. 22, 1917.

1,260,821.

Patented Mar. 26, 1918.
2 SHEETS—SHEET 2.

Fig. 5.

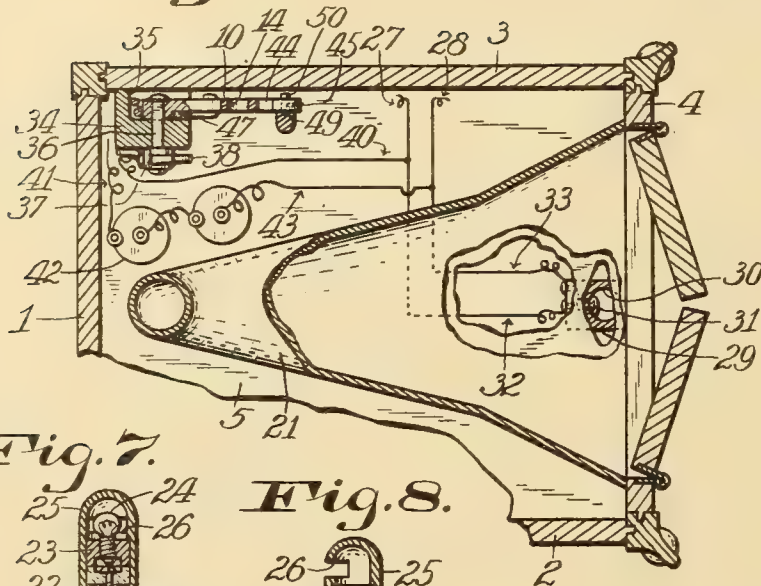


Fig. 6.

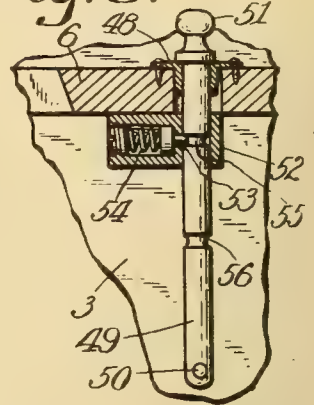


Fig. 7.

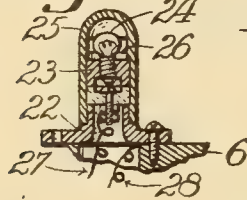


Fig. 8.



Fig. 10.

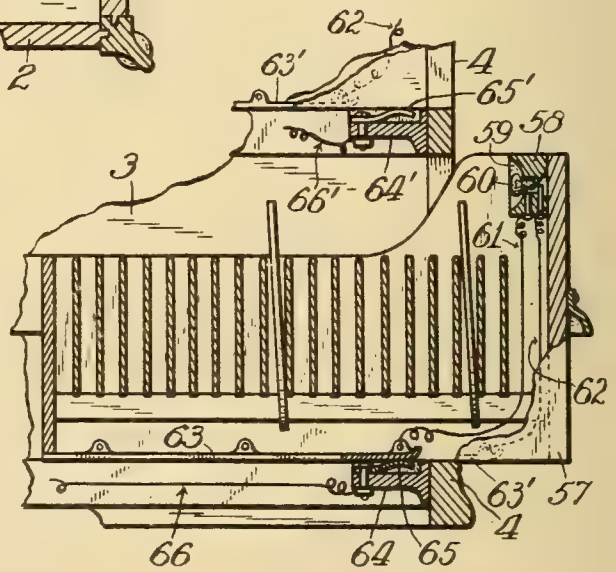


Fig. 9.

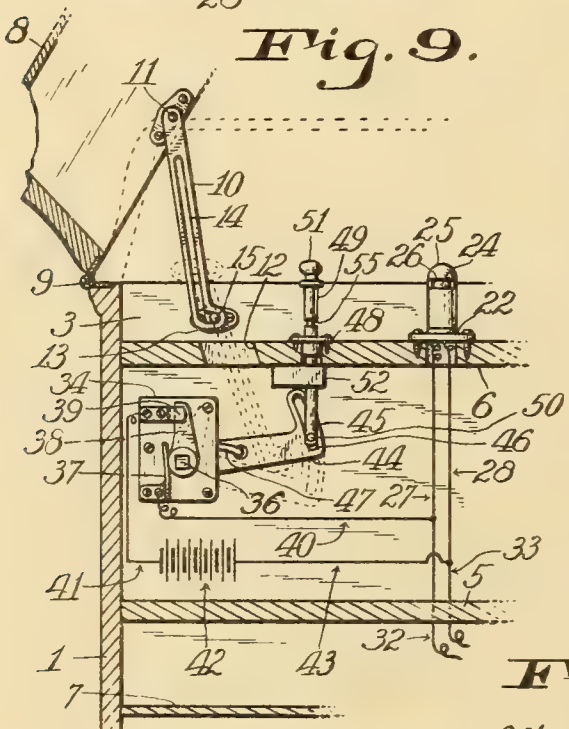


Fig. 11.

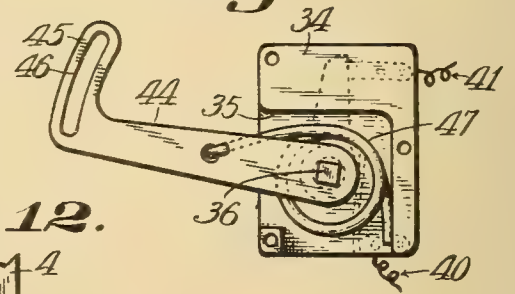
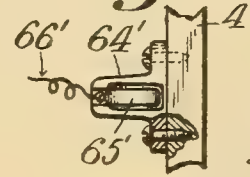


Fig. 12.



WITNESSES:

J. H. Gardner.
Myrtle M. Coy.

INVENTORS:

Gilbert J. Sellmeyer,
Loyal H. Britton,
By E. J. Silvius,
ATTORNEY.

UNITED STATES PATENT OFFICE.

GILBERT J. SELLMAYER AND LOYAL H. BRITTON, OF INDIANAPOLIS, INDIANA.

TALKING-MACHINE LIGHTER.

1,260,821.

Specification of Letters Patent.

Patented Mar. 26, 1918.

Application filed March 22, 1917. Serial No. 156,734.

To all whom it may concern:

Be it known that we, GILBERT J. SELLMAYER and LOYAL H. BRITTON, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Talking-Machine Lighter, of which the following is a specification, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

This invention relates to appliances for artificially lighting talking machines and especially those of the type that use disk records, the invention having reference more particularly to appliances whereby the records may be illuminated.

An object of the invention is to provide a talking machine lighter that shall be so constructed and arranged as to permit the machine to be operated advantageously on a dark porch or elsewhere at night time as well as in a lighted room. Another object is to provide means whereby electric lights for a talking machine may be conveniently controlled, either manually or automatically and be simple and inexpensive. A further object is to provide a talking machine lighter that may be operated at intervals when needed and not be annoying, because of strong or unshaded light, to the audience when the talking machine is in operation.

With the above-mentioned and other objects in view the invention consists in the novel parts or structures, and in the combinations and arrangements of parts, relating to the equipment of talking machines, as hereinafter particularly described and further defined in the accompanying claims.

Referring to the drawings,—Figure 1 is a perspective view of a talking machine of the cabinet type and equipped with the invention; Fig. 2 is a top plan of the talking machine minus the cover of the cabinet; Fig. 3 is a fragmentary section approximately on the line III—III on Fig. 2; Fig. 4 is a fragmentary sectional plan on the line IV—IV on Fig. 3 inverted; Fig. 5 is a fragmentary sectional plan approximately on the line V—V on Fig. 3; Fig. 6 is a fragmentary detail of the devices for manual control of the lights; Fig. 7 is a vertical central section of the main lamp, as on the line IX—IX on Fig. 2; Fig. 8 is a section of the reflecting hood of the main lamp on a plane at right angles to the line IX—IX;

Fig. 9 is a fragmentary section approximately on the line IX—IX with the cover of the cabinet arranged in open position; Fig. 10 is a fragmentary section showing a drawer in the cabinet for holding records and provided with a lamp; Fig. 11 is an elevation of the controlling appliances for the lights, and, Fig. 12 is a top plan of one of the appliances shown in Fig. 10.

Similar reference characters on the different figures of the drawings indicate like elements or features of construction herein referred to.

A talking machine to which the invention is most advantageously applied includes a cabinet which comprises a back 1, sides 2 and 3 and a front 4 to constitute an inclosure, the front having suitable openings as will be understood. The interior of the cabinet has a floor 5 comprising the bottom of the sound box and machinery chamber, the interior having also a top or motor board 6 that is arranged on a plane below the top of the walls of the cabinet. The cabinet is provided below the floor 5 with suitable devices for holding records, in some cases a suitable number of shelves 7 being provided. A cover 8 normally rests upon the top of the cabinet walls and is connected by means of hinges 9 to the back or rear wall 1. In order to hold the cover in inclined position on its hinges it is provided with a prop 10 connected by means of a pivot 11 to the inside of the cover, the prop normally extending downward through a slot 12 in the top 6 when the cover is closed. The prop has a foot 13 on its lower end and has also a slot 14 therein that extends into the foot to receive a guide stud 15 which is secured to the inside of the side wall 3 of the cabinet, the stud supporting the prop when elevated with the cover. The machine has also a turn-table 16 which is arranged above the top 6 and supports a disk record 17 which as will be understood has a label 18 thereon. Also as will be understood the machine has a needle 19 carried by an arm 20 that is connected with a horn 21 arranged above the floor 5. The various features above-mentioned are well known and may differ in detail on different machines.

In order to enable the operator to properly adjust a record on the turn-table and also adjust the needle on the record the top 6 is provided adjacent to the turn-table 16 with an electric lamp which comprises a

base 22 supporting a socket 23 to which an incandescent electric lamp 24 is connected and provided with a hood 25 that is connected to the base and covers the lamp but
 5 has a slot 26 therein to permit the light rays to be reflected onto the record, the base being secured upon the top 6 so as to be in proximity to the position of the needle 19 when the machine is prepared to operate.
 10 Thus the hood shields the eyes of the operator and the audience from the glare of the light while illuminating that portion of the top of the record which must be observed by the operator when adjusting the needle
 15 or starting the machine. The lamp is provided with electrical circuit wires 27 and 28 which extend downward below the top 6.

In order to provide sufficient light for the operator to see and read the labels on the
 20 records so that a selection may be made from the records on the shelves 7, a lamp holder 29 is suitably secured in place below the floor 5 and adjacent to the front 4, and it has a reflecting recess 30 in its forward portion in which an incandescent lamp 31 is
 25 suitably supported and provided with circuit wires 32 and 33, the lamp being so arranged that light therefrom shall be reflected downwardly and outwardly through
 30 the opening in the front 4, so as to illuminate the tops of the records as they are drawn forward through the opening in the front of the cabinet, thus preventing the glare of the light from being projected
 35 toward the audience.

For the purpose of controlling the lights a switch housing 34 is provided which is secured to the inside of the side 3 of the cabinet below the top 6 and it has a recess
 40 35 in its back and also rotatively supports an axle 36. An electrical brush 37 is mounted on the housing in proximity to the axle, and a switch blade 38 is secured to the axle so that its hub shall be in contact with
 45 the brush, the blade being adapted to be swung into contact with a contact-finger 39 which is mounted also on the housing. A circuit wire 40 is connected with the brush 37 and also with the wires 27 and 32. A
 50 circuit wire 41 is connected with the finger 39 and also with a suitable source of electricity, such as a battery 42, the battery being arranged in the cabinet, a circuit wire 43 being connected with the battery and also
 55 with the circuit wires 28 and 33. A controller arm 44 is secured to the axle 36 in the recess 35 of the housing and extends adjacent to the inside of the cabinet wall 3 so as to be engaged by the prop 10 when the
 60 cover 8 is being lowered, such prop being conveniently available, for disengaging the blade 38 from the contact-finger 39 to break the lighting circuit. The arm 44 has an upwardly extending projection 45 that has a
 65 slot 46 therein arranged concentrically to the

axle 36. The arm is provided with a spring 47 which automatically swings the arm upward when released and causes the circuit to be restored by moving the blade 38 into
 connection with the finger 39. The control
 70 of the lights as will be seen is automatic and controlled through the operation of the cover 8. In order to permit manual control of the lighting circuit, a guide 48 is secured to the top 6, in a suitable aperture, therein and
 75 vertically guides a push rod 49 which is provided with a stud 50 that extends into the slot 46 and when carried to the bottom of the slot enables the rod 49 to push the arm 44 downward in order to break the electrical
 80 circuit. The top of the push rod 49 has a knob or handle 51 thereon that is accessible above the top 6. A latch case 52 is mounted under the top 6 and has a latch 53 therein that is provided with a projecting spring 54
 85 to hold the latch against the rod 49, the latter having grooves or recesses 55 and 56 therein to separately receive the point of the latch, the point being rounded so as to be forced from the recess or groove when
 90 the rod is forcibly moved longitudinally. When the latch 53 is in the notch or groove 56, the rod being in elevated position, the arm 44 may be pushed downward by the prop 10 without causing movement of the
 95 rod 49, the slot 46 affording clearance for the stud 50.

In some cases, instead of shelves 7, drawers 57 are provided in the lower portion of the cabinet for holding the records in vertical
 100 arrangement on edge, and in such case a lamp holder 58 is mounted on the inside of the upper portion of the front of the drawer and has a reflecting recess 59 that faces inward toward the records, an incandescent
 105 electric lamp 60 being supported by the holder in the recess, so that the light is thrown toward the fronts of the records to permit the labels on the records to be read when the drawer is moved forward partially
 110 out of the cabinet. The lamp is provided with circuit wires 61 and 62 that may be suitably connected with a source of electricity, one wire preferably being connected to a contact plate 63 secured horizontally to
 115 the drawer, the remaining wire being connected to a similar contact plate 63' mounted also on the drawer. An anchor block 64 is secured to the cabinet inside the front 4 and supports a brush 65 in contact with
 120 the contact plate 63, a similar block 64' being supported at another point and having a brush 65' to be engaged by the contact plate 63'. The brush 65 has a circuit wire 66 connected therewith, the other brush 65'
 125 having a circuit wire 66' connected therewith, and it will be understood the circuit wires are suitably supplied with electrical current, the circuit being broken automatically when the drawer is closed and auto-
 130

matically established when the drawer is drawn forward.

In practical use the cover 8 is lifted to inclined position, as in Figs. 1 and 9 so that the prop 10 is drawn away from the arm 44 and supports the cover in open position. When the arm 44 is released the spring 47 forces the arm upward and therefore the switch blade 38 is carried to the contact finger 39 and establishes the lighting circuit, it being understood that the push rod 49 is latched in elevated position so as to not interfere with the upper movement of the arm 44. In case the lights are not needed the push rod 49 can be pushed downward if not already in lowered position in order to break the circuit. In case the lights are needed the operator can proceed to select a record with the benefit of the light from the lamp 31 or a lamp 60, and will also have the benefit of the light from the lamp 24 while placing the record upon the turn-table 16 and adjusting the needle 19 to the record. Having prepared the machine for operation the cover 8 may be lowered as is customary, and as the prop 10 descends it engages the arm 44 and pushes it downward so that the lighting circuit is automatically broken. In case the operator should forget to close the cover the presence of the lights may remind him of the oversight; but in some cases it may be preferred to operate with the cover open and under such circumstances the lights may be extinguished by pushing downward on the knob 51 so as to break the lighting circuit.

In some cases the cover is commonly provided with a prop that operates entirely above the top 6 so as to be unsuitable for use with the present invention; and it will be understood that in such case a controlling-rod, arranged similarly to the prop 10 and operating as described to move the arm 44, may obviously be employed without requiring the controlling-rod to support the cover.

Having thus described the invention, what is claimed as new is—

1. A talking-machine lighter including a supported housing, an axle rotatively mounted in the housing, an electrical contact device mounted on the housing, a switch blade secured to the axle and movable to or from the contact device, an operating-arm secured to the axle and having a slot therein concentric to the axle, a spring cooperating with the housing and the operating-arm to move the switch blade to the contact device, a supported guide, a push-rod movable in the guide and having a stud thereon extending into said slot, a holding latch for the push-rod, and an electric lamp.

2. In a talking-machine lighter, the combination with the record-supporting turn-

table, of an electric lamp supported adjacent to one edge portion of the turn-table and having a reflecting-hood thereon adapted to direct the rays from the lamp onto said turn-table, an electric lamp supported in proximity to said record-holder and having a reflecting-hood thereon adapted to direct the rays from the lamp onto the record-holder, a supported electrical switch, circuit wires connected with said lamps and said switch, and means for operating said switch.

3. The combination with a cabinet wall, and a turn-table, of a top plate having an aperture therein, the plate being under the turn-table and supported by the inside of said wall, a guide in said aperture and secured to said plate, an electric lamp mounted upon said plate adjacent to the turn-table, an electrical switch mounted on the inside of said wall below said plate and having a movable operating-arm, an electrical circuit connected with said switch and said lamp, and a push-rod movably arranged in said guide and connected with said operating-arm.

4. The combination, with a talking-machine comprising a cabinet wall, a cover hinged to the wall, a rod pivoted to the cover and guided to prevent swinging thereof relatively to the cabinet wall, and a turn-table, of a top plate having an aperture in proximity to one edge portion thereof, said plate being under the turn-table and supported by said wall, an electric lamp arranged above said aperture and supported upon said plate adjacent to said turn-table, an automatically-closing electrical switch mounted on the inside of said wall below said plate and having an operating-arm movably arranged below said rod to be engaged by the latter to open the switch, and circuit wires connected with said switch and extending through said aperture to said lamp.

5. In a talking-machine lighter, the combination with a cabinet, a cover hinged to the cabinet, a prop pivotally connected to the cover, and a guide for the prop permitting longitudinal movement of the prop during movement of the cover and preventing lateral movement of the prop at the guide during the longitudinal movement, of an electric lamp for the cabinet, an electrical circuit for the lamp, an electrical switch provided with an operating device arranged in the path of movement of the prop to be engaged thereby to open the circuit, and a spring operating to actuate the switch to close the circuit when the prop is disengaged from the operating device.

6. In a talking-machine lighter, the combination with a cabinet, a cover hinged to the cabinet, a rod pivotally connected to the cover, and means for guiding the rod on

movement of the cover to prevent swinging movement of the rod, of an electrical lamp for the top of the cabinet, an electrical circuit for the lamp, an electrical switch for the circuit, means for automatically moving the switch to close the circuit on movement of the cover away from the cabinet whereby the rod is moved upwardly, the switch being actuated by the prop to open the circuit on downward movement of the cover, and means for independently controlling the switch when the cover is in open position.

7. In a talking-machine lighter, the combination with a cabinet, a record-supporting turn-table in the cabinet, a holder for a plurality of records in the cabinet below the turn-table, a cover hinged to the cabinet, and a prop pivoted to the cover and guided in the cabinet, of an electric lamp supported in proximity to said holder and having a reflecting-hood thereon adapted to direct the rays from the lamp onto the holder, a supported electrical switch, an electrical circuit connected with the switch and said lamp, and means connected with the switch includ-

ing a device to be engaged by the prop for enabling the prop to control the switch.

8. A talking-machine lighter comprising an electric lamp adapted for the top of the talking-machine, an electric lamp adapted for the lower portion of the talking-machine to illuminate the record labels, an electrical circuit for the lamps, an electrical switch adapted for closing or opening the circuit, means for automatically actuating the switch to close the circuit, a controlling device operable by a part of the talking-machine and adapted to automatically actuate the switch to open the circuit, and means operable independently of the controlling device and adapted for actuating the switch to open the circuit.

In testimony whereof, we affix our signatures in presence of two witnesses.

GILBERT J. SELLMEYER.
LOYAL H. BRITTON.

Witnesses:

E. T. SILVIUS,
J. H. GARDNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

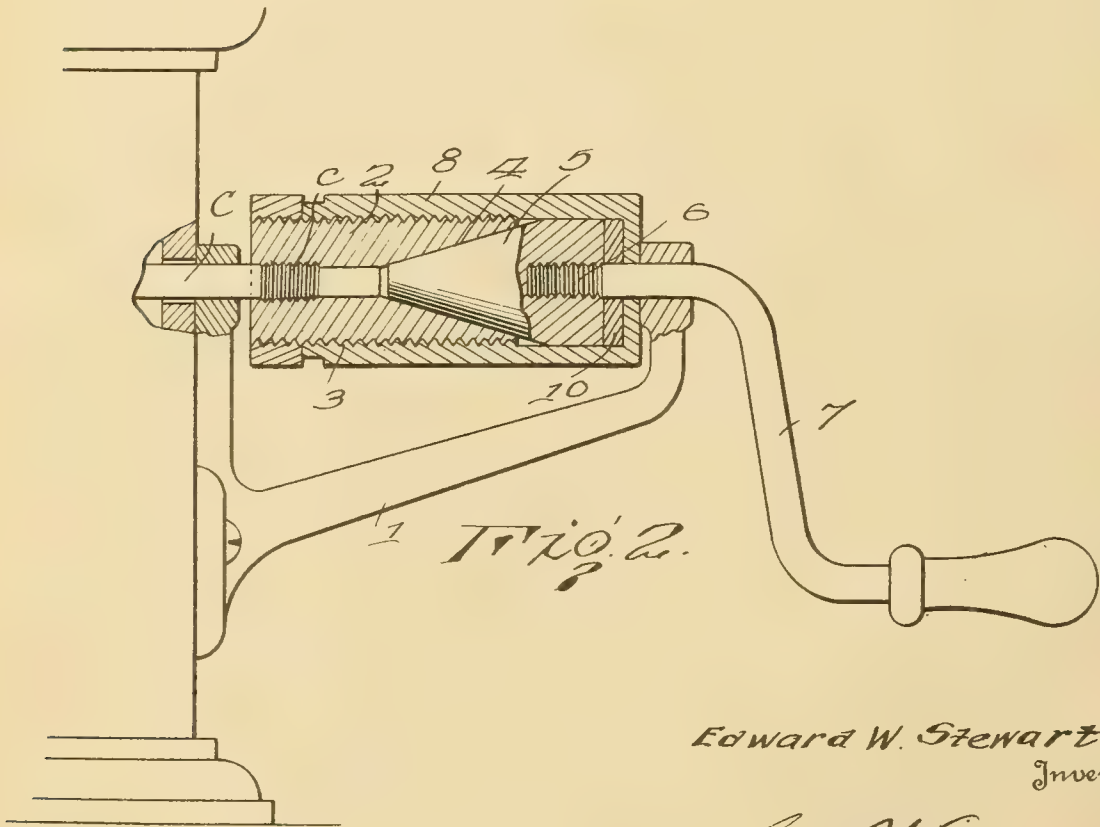
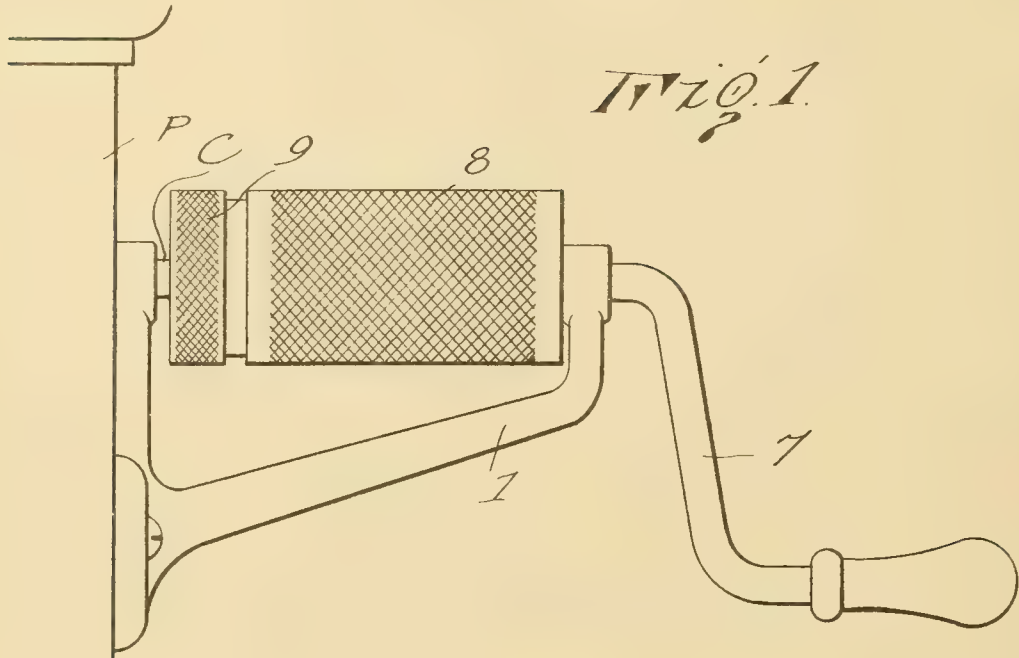
SAFETY CRANK FOR SPRING MOTORS.

1,260,829 ----- E. W. Stewart,
Filed May 21, 1917,
Patented Mar. 26, 1918.

E. W. STEWART.
SAFETY CRANK FOR SPRING MOTORS.
APPLICATION FILED MAY 21, 1917.

1,260,829.

Patented Mar. 26, 1918.



Edward W. Stewart
Inventor

By *Geat. Kimmel.*
Attorney

UNITED STATES PATENT OFFICE.

EDWARD W. STEWART, OF SANDUSKY, OHIO.

SAFETY-CRANK FOR SPRING-MOTORS.

1,260,829.

Specification of Letters Patent.

Patented Mar. 26, 1918.

Application filed May 21, 1917. Serial No. 169,986.

To all whom it may concern:

Be it known that I, EDWARD W. STEWART, a citizen of the United States, and resident of Sandusky, in the county of Erie and State of Ohio, have invented certain new and useful Improvements in Safety-Cranks for Spring-Motors, of which the following is a specification.

This invention relates to cranks of the type employed for winding the springs of spring motors of phonographs and the like and it is the dominant object of the invention to provide a crank having a novel form of clutch interposed therein, the same serving as a safe guard against the winding of the motor spring too tight, which oftentimes causes the breaking or disabling of the same.

Among other aims and objects of the invention may be recited, the provision of a device of the character mentioned with a view to compactness, and in which the number of parts are few, the construction simple, the cost of production small, and efficiency and operation high.

All of the foregoing together with additional advantageous details and arrangements of parts of the preferred embodiment of my invention will be clear from the description hereinafter contained, when read in connection with the accompanying drawings forming parts hereof, wherein said embodiment of the invention is illustrated for the purpose of facilitating a full understanding of the present improvements.

In the drawings:

Figure 1 is a side elevation of my improved crank as applied to the crank shaft of a phonograph spring motor; and

Fig. 2 is a longitudinal section thereof through.

Referring now more specifically to the several figures of the drawings and in connection with which like reference characters will refer to the same parts in the several views, the letter P designates the crank side of the cabinet of a phonograph having the crank shaft C extending therefrom, the outer end of which is screw threaded as at *c*. A bracket 1 having an apertured outer end is secured to the crank side of the phonograph casing C and serves as means for

rotatably supporting the outer portion of the improved crank, which will be hereinafter more fully described.

The screw threaded portion *c* of the crank shaft C is passed into engagement with a bearing 2 preferably formed of bronze and having other screw threads 3 arranged upon its outer face or periphery and a conical seat 4 formed in one end thereof. Into the conical seat 4 a crank cone, preferably formed of steel and designated by the numeral 5 is inserted, the said cone having a screw threaded pocket formed in its outer end adapted for receiving the complementally threaded extremity 6 of the crank handle 7.

About the bearing 2 and the crank cone 5 an internally threaded sleeve 8 is arranged, the sleeve being locked in adjusted position through the medium of a knurled nut 9 engaged with the remaining screw threaded portion of the bearing 2. A thrust washer 10 composed of fiber is arranged between the sleeve and the crank cone and obviously, compensates for thrust and wear on the same. By engaging the internally screw threaded sleeve 8 with the locking nut 9, it is to be understood that the frictional clutch afforded by the bearing 2 and the crank cone 5 may be adjusted to secure the same at any tension equal to that of the wound spring, but which will allow the cone to slip within its seat, namely, the conical seat 4, at any tension above that. Thus, overwinding of the motor spring is eliminated.

Manifestly, the construction shown is capable of considerable modification and such modification as is within the scope of my claims, I consider within the spirit of my invention.

I claim:

1. A crank carrying a cone upon one end thereof, a bearing having a conical pocket formed therein for receiving said cone and a screw threaded pocket formed in its free end, means for connecting the cone and the bearing, and means engaged with said first means for locking the same at a desired tension.

2. A crank carrying a cone on one end thereof, a screw threaded bearing having a

conical seat for receiving the cone, and adjustable means arranged about the cone and the bearing for coupling the same.

3. A crank carrying a cone on one end
5 thereof, a screw threaded bearing having a conical seat for receiving the cone, an internally threaded sleeve arranged about the

cone and said bearing for coupling the same, and means engaged with said sleeve for locking the same in an adjusted position. 10

In testimony whereof, I affix my signature hereto.

EDWARD W. STEWART.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

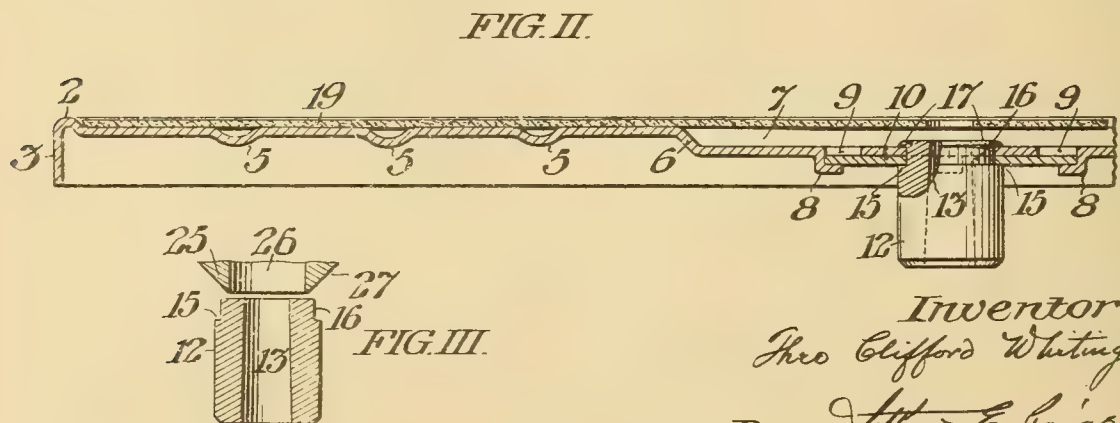
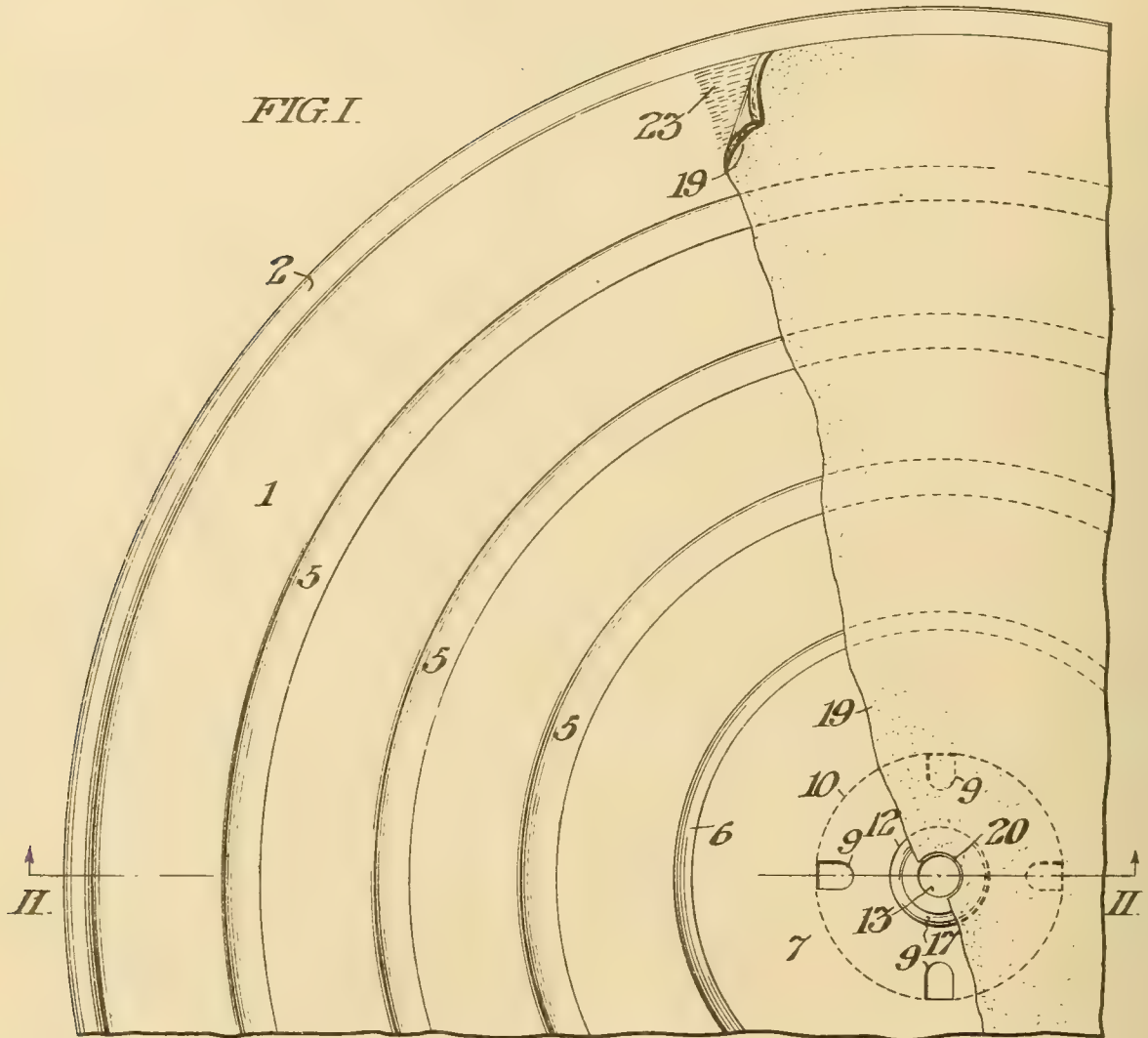
ROTARY TABLE FOR SOUND RECORD DISKS.

1,260,948 ----- T. C. Whiting,
Filed July 5, 1916,
Patented Mar. 26, 1918.

T. C. WHITING.
 ROTARY TABLE FOR SOUND RECORD DISKS.
 APPLICATION FILED JULY 5, 1916.

1,260,948.

Patented Mar. 26, 1918.



Inventor:
 Theo Clifford Whiting,
 By Arthur C. Paige,
 Attorney.

UNITED STATES PATENT OFFICE.

THEO CLIFFORD WHITING, OF PHILADELPHIA, PENNSYLVANIA.

ROTARY TABLE FOR SOUND-RECORD DISKS.

1,260,948.

Specification of Letters Patent.

Patented Mar. 26, 1918.

Application filed July 5, 1916. Serial No. 107,718.

To all whom it may concern:

Be it known that I, THEO CLIFFORD WHITING, a citizen of the United States, residing at Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Rotary Tables for Sound-Record Disks, whereof the following is a specification, reference being had to the accompanying drawing.

My invention relates to tables formed of pressed sheet metal, having means adapted to detachably engage a motor shaft, and means to detachably engage and turn a sound record disk, in concentric relation with said table. As ordinarily constructed, such tables include a plane disk having an axial hub riveted therein, without any reinforcement at the junction thereof, and having a sheet of felt upon its upper surface. In such construction the disk is apt to be distorted from normal relation to the axis of the hub by pressure upon the margin of the disk incident to the manual operation of fitting the sound records upon the table, and, although it has been proposed to prevent such distortion by making the disks of metal much heavier than is otherwise required for the normal function of the table, such increase in weight not only largely increases the cost of construction of such tables but is objectionable in that it necessitates an added load upon the motor. Moreover, such ordinary tables do not include any means for protecting the outer edge of the felt thereon, and the latter is apt to be loosened and turned up by the impingement of the fingers of the operator. Therefore, it is the object of my invention to provide a table including such reinforcing means at the central portion of its disk, that the latter may be made of thinner metal than heretofore, with consequent economy in the manufacture of such tables, and also to provide said disk with a raised rim serving as a shield for the outer edge of the felt or other resilient fabric cover thereon, so as to prevent displacement of said edge.

My invention includes the various novel features of construction and arrangement

hereinafter more definitely specified and claimed.

In said drawing; Figure I is a fragmentary plan view of a table embodying my invention, the resilient fabric cover thereof being partly omitted.

Fig. II is a fragmentary sectional view of said table, taken on the line II, II in Fig. I, showing the fabric cover in position.

Fig. III is a vertical sectional view of the hub element of my invention before its insertion and deformation in the table to rigidly engage the latter.

In said figures; the table includes the pressed sheet metal disk 1 having the circumferential bead 2 forming a rim ridge projecting from the upper face of said disk at the perimeter of the latter and said bead merges into the cylindrical flange 3 extending from the lower face of said disk and reinforcing the periphery of said disk. Said disk is also, preferably, reinforced intermediate of its expanse, by a series of beads 5 pressed therein so as to project from the lower face thereof, and is further reinforced by being countersunk at 6, forming a recess 7; said ribs 5 and countersunk portion 6 being concentric with said flange 3. The circular series of tabs 8 are projected from the same face of said disk as said flange 3, by stamping means thrust through the openings 9 at the bottom of said recess 7. The reinforcing plate 10 is rigidly held in concentric position on said disk 1 by said tabs 8, which are clenched over the edges of said plate 10 as shown in Fig. II. The axial hub 12 has the internal conical shaft bearing 13 for detachable engagement with the shaft of a motor by which the table may be rotated, and said hub has the external shoulder 15 bearing upon said plate 10, and also has the tubular shank 16 which extends through said plate and disk and has the annular flange 17 pressed into engagement with the face of said disk in opposition to said shoulder 15. The cover 19, which is preferably formed of resilient textile material, is fitted upon the face of said disk 1 with its perimeter adjacent said ridge 2 and pro-

tected thereby, and said cover has the axial opening 20 in registry with the shaft bearing 13 in said hub. Said cover is preferably secured upon said disk by providing the upper face of the latter with a coating 23 of cement, formed of resin dissolved in wood alcohol.

To minimize the cost of manufacture of such tables as above described, I prefer to form the shaft bearing 13 in the hub 12 before assembling the latter in the table, and, in order to prevent distortion of the upper edge of the shaft bearing 13 in said hub by the operation of riveting the outer edge of the shank 16 to form said flange 17; I prefer to employ a riveting tool 25 which, as indicated in Fig. III, has a cylindrical axial opening 26 with a cutting edge; so that the shank 16 of said hub 12 is cut and held in circumferential relation with the disk 1, by said tool edge, while the marginal portion of said shank is spread outwardly by the inclined surface 27 of said tool to form said flange 17.

I prefer to make said table disk of sheet steel and to provide the same with a plating of other metal, for instance nickel, which may be polished where it projects from beneath the textile cover 19. It may be observed with reference to Fig. II that the outer edge of said cover 19 is in spaced relation with the ridge formed by said circumferential bead 2, so as to expose all of the surface of said bead which is thus polished. However, the ordinary pressing operation whereby such a bead as indicated at 2 may be formed stretches the convex surface of the metal and leaves it so porous that it has a rough appearance when subsequently plated and polished. Therefore, I prefer to burnish, or otherwise condense, the convex surface of said bead 2, so as to close the pores opened by the bending operation and render it smooth before plating and polishing it, and thus avoid the rough appearance aforesaid, and stiffen said disk.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention as defined in the appended claims.

I claim:—

1. In a rotary table adapted to support and turn a sound record; the combination with a pressed sheet metal disk having a circumferential bead forming a burnished rim ridge projecting from the upper face of said disk, a peripheral cylindrical flange extending from the lower face of said disk and merging into said bead, and a circular series of tabs pressed from said disk, and projected from the same face of said disk

as said flange; of a reinforcing plate rigidly held in concentric position on said disk by said tabs; an axial hub having an internal conical shaft bearing, an external shoulder bearing upon said plate, a tubular shank extending through said plate and disk, and an annular peripheral flange pressed into engagement with the face of said disk, in opposition to said shoulder; a cover of resilient textile material fitted upon the face of said disk with its perimeter shielded by said ridge, and having an axial opening in registry with the shaft bearing in said hub; and adhesive means securing said cover upon said disk.

2. In a rotary table adapted to support and turn a sound record; the combination with a pressed sheet metal disk having a circular series of tabs pressed from said disk; of a reinforcing plate rigidly held in concentric position on said disk by said tabs; and an axial hub having an internal shaft bearing, an external shoulder bearing upon said plate, a tubular shank extending through said plate and disk, and an annular peripheral flange pressed into engagement with the face of said disk, in opposition to said shoulder.

3. In a rotary table adapted to support and turn a sound record; the combination with a pressed sheet metal disk having tabs; of a reinforcing plate rigidly held in concentric position on said disk by said tabs; and an axial hub having an internal shaft bearing, an external shoulder bearing upon said plate, a tubular shank extending through said plate and disk, and an annular flange pressed into engagement with the face of said disk, in opposition to said shoulder.

4. In a rotary table adapted to support and turn a sound record; the combination with a sheet metal disk having an axial opening; of a plane reinforcing plate in concentric relation with said disk and having an axial opening; and a hub extending through said disk and plate, having means securing them in rigid relation.

5. In a rotary table adapted to support and turn a sound record; the combination with a sheet metal disk having an axial hub; of a plane reinforcing plate in concentric relation with said disk, but of smaller diameter; said disk and plate being rigidly connected.

6. In a rotary table adapted to support and turn a sound record; the combination with a sheet metal disk having an axial hub; of a reinforcing plate in concentric relation with said disk, but of smaller diameter; and means on said disk, independent of said hub, rigidly connecting said disk and plate.

7. In a rotary table adapted to support
and turn a sound record; the combination
with a sheet metal disk having an axial
hub; of a reinforcing plate in concentric re-
5 lation with said disk, but of smaller diam-
eter; and means, independent of said hub,
rigidly connecting said disk and plate.

In testimony whereof, I have hereunto
signed my name at Philadelphia, Pennsyl-
vania, this fourteenth day of June, 1916.

THEO CLIFFORD WHITING.

Witnesses:

ARTHUR E. PAIGE,
ANNA ISRAELVITZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

PHONOGRAPH.

1,261,174 ----- C. Stein,
Filed Oct. 14, 1916,
Patented Apr. 2, 1918.

1,261,174.

Patented Apr. 2, 1918.
 2 SHEETS—SHEET 1.

Fig. 1.

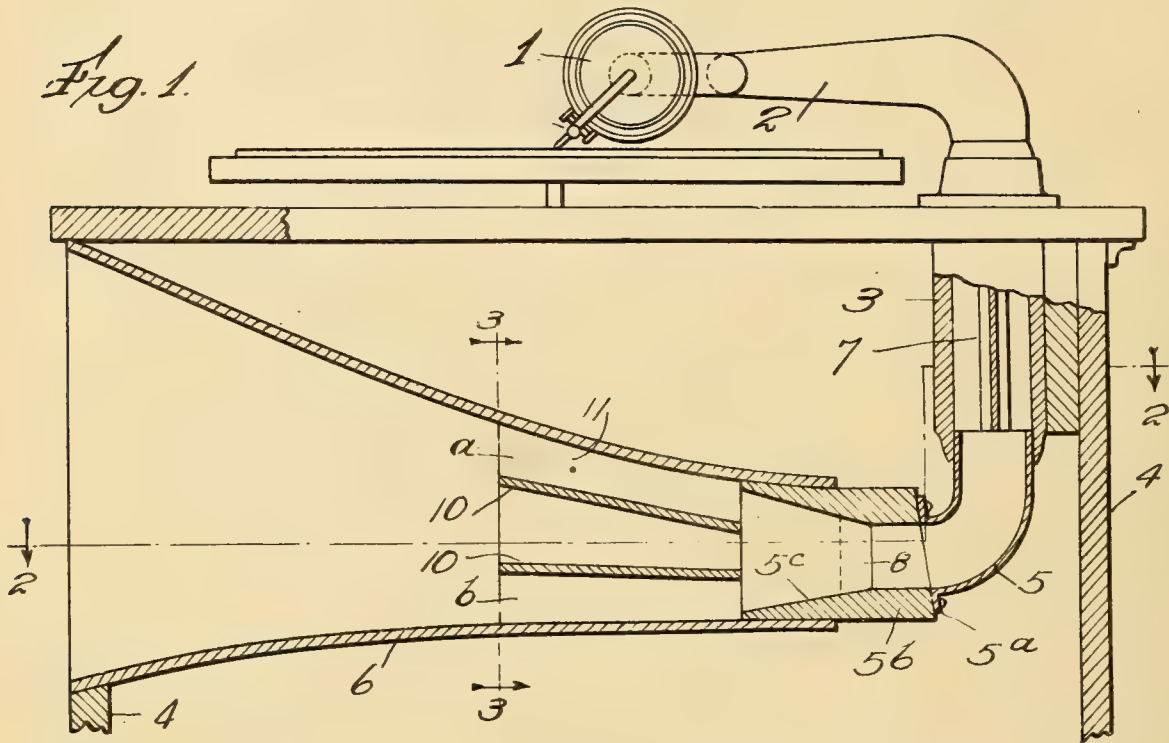
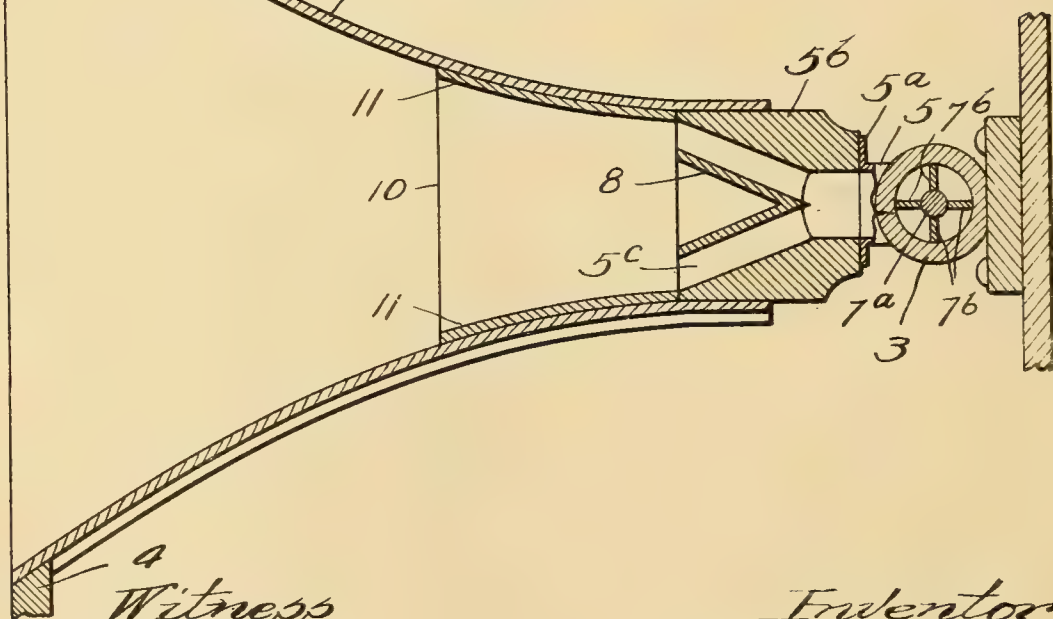


Fig. 2.



Witness
Carl Stein

Inventor:
 Carl Stein,
 by *Burton Burton*
 his Attys.

C. STEIN.
PHONOGRAPH.

APPLICATION FILED OCT. 14, 1916.

1,261,174.

Patented Apr. 2, 1918.
2 SHEETS—SHEET 2.

Fig. 3.

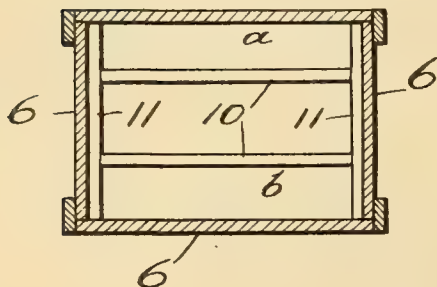


Fig. 4.

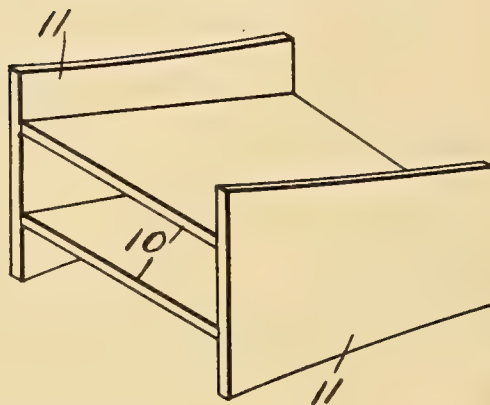


Fig. 5.

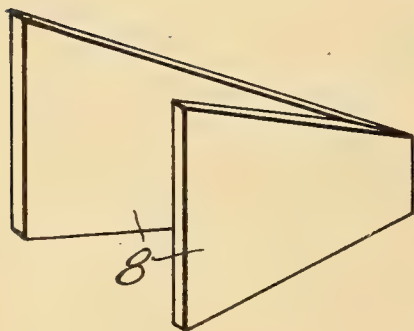
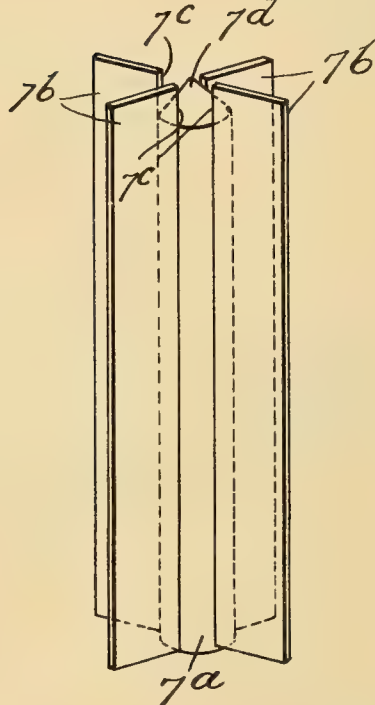


Fig. 6.



Witness
Carl Stein

Inventor:
Carl Stein,
by Burton & Burton
Atty's.

UNITED STATES PATENT OFFICE.

CARL STEIN, OF STEGER, ILLINOIS, ASSIGNOR TO STEGER & SONS PIANO MANUFACTURING COMPANY, OF STEGER, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH.

1,261,174.

Specification of Letters Patent.

Patented Apr. 2, 1918.

Application filed October 14, 1916. Serial No. 125,535.

To all whom it may concern:

Be it known that I, CARL STEIN, a citizen of the United States, residing at Steger, in the county of Will and State of Illinois, have
5 invented new and useful Improvements in Phonographs, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 The purpose of this invention is to provide an improved construction in a phonograph or sound-reproducing instrument, particularly with respect to the amplifying and resonating devices. It consists in the elements and features of construction shown
15 and described, as indicated in the claims.

In the drawings:—

Figure 1 is a vertical section, axial with respect to the vertically-extending member
20 of the sound conduit, of a phonograph embodying the features of this invention, the reproducer and tone arm and the record-carrier being shown in side elevation and conventionally,—that is, without regard to
25 details of construction.

Fig. 2 is a vertical section at the line, 2—2, on Fig. 1.

Fig. 3 is a section at the line, 3—3, on Fig. 1.

30 Fig. 4 is a perspective view of a removable resonating device adapted to be contained in the horn mouth or amplifier.

Fig. 5 is a perspective view of an obstructive deflecting device, adapted to be positioned at the smaller end of the amplifier
35 or horn mouth terminal of the conduit.

Fig. 6 is a perspective view of a partitioning device employed in the sound conduit at the entrance to the amplifier or resonator.

40 The drawings illustrate a phonograph which in the general features of construction is familiar, comprising a reproducer or sound box, 1, a tone arm, 2, to one end of which the sound box is connected, and which
15 is pivoted at the other end to the upright portion, 3, of the sound conduit. This upright portion, 3, of the conduit is of wood mounted in any convenient manner rigid with the cabinet work or inclosing case, 4,
50 which also supports the remainder of the

sound conduit, comprising the amplifier and resonator. This amplifier and resonator is preferably made of wood constituting a horn mouth tapered widening toward its discharge end, the angle of taper or widening
55 increasing from the smaller to the larger end in both horizontal and vertical dimensions, but more rapidly in the horizontal direction, as may be understood from the drawings; the result being, of course, that
60 in longitudinal outlines, both in vertical and horizontal section, this horn mouth is exteriorly curved concavely. This amplifier is oblong in cross-section at all points of its length, the disparity in the two dimensions,
65 however, increasing from the smaller to the larger end. The horn or amplifier 6, is connected with the upright member, 3, of the conduit by a cylindrical elbow member, 5, whose diameter is substantially unchanged
70 throughout the 90-degree-bend of the elbow. The upper end of the elbow is telescoped into the lower end of the cylindrical upright member, 3, and the lower forwardly-facing end is flanged at 5^a, for securing it to a
75 wooden junction member, 5^b, which connects the elbow with the amplifier. This elbow-connecting member, 5^b, is a wooden block which is rectangular in cross section for fitting within the smaller end of the amplifier,
80 and has a duct from end to end for the sound conduit into the amplifier, said duct being at the portion, 5^c, beyond the cylindrical entrance which fits the lower forward end of the elbow, rectangular in cross-section and
85 tapered widening to the end which opens into the amplifier.

The amplifier, 6, besides being a sound-conductor, is designed to be a resonator,—that is, it is designed not only to amplify
90 the vibrations by its expanding form, but to intensify them by its own responsive vibration. Partly for the purpose of increasing this responsive vibratory action of the amplifier, there is provided a device which
95 is shown in Fig. 6, which is inserted in the vertical portion, 3, of the conduit for partitioning that portion of the conduit into a plurality of longitudinal subdivisions or parallel conduits lying adjacent to the cy- 100

lindrical wall of said member, 3. This device comprises the central hub or axial body, 7^a, and any desired number,—as illustrated, four,—radially extending webs or vanes, 7^b, which make contact with the inner cylindrical surface of the said vertical portion, 3, of the conduit. It will be observed that this device by its central or hub portion excludes the air vibrations from so much of the space, and the remainder of the conduit space in this vertical portion, 3, is divided into separate conduits to which the tone arm transmits the sound vibrations, which blend and cooperate in producing the vibration of the air body through the elbow member, 5, and connecting block, 5^b, and into the amplifier and resonator, 6. It is found that to a certain extent the sound vibrations are clarified by being limited to the smaller or subdivided passages by the device, 7, and this effect continues where the vibrations are somewhat restricted to the outer circumferential portion of the conduit, beyond the part, 3,—that is, in the elbow member, 5, and this is the purpose of the device. Carrying out this purpose still further, and supplementing it,—there is provided in the rectangular tapering portion 5^c, of the cavity of the elbow connecting member, 5^b, there is located a wedge-shaped deflector, 8, which is tapered also, but not to a point, in a plane transverse to that in which it is tapered to an edge as seen in Fig. 5. That is to say, the device is tapered in both directions correspondingly to the taper of the said tapering portion of the cavity, 5^c, its vertical dimension being the full corresponding dimension of said cavity which is oblong at its larger end, though it is circular at the smaller end; the result is that the space in said tapering portion of said tapering cavity is obstructed at the middle portion by said wedge-shaped and tapered deflecting device, 8, leaving equal lateral and separated portions at opposite sides, with the effect of causing the sound vibrations to be transmitted by separate lateral bodies of air, and with a clarification of the vibration somewhat increased beyond what it would be if the central portion were not excluded from the vibrations by said deflecting wedge-shaped device, 8, and with the effect desired, namely, that said clarified vibrations occur in the body of the air adjacent to the lateral walls of the amplifier and resonator, 6, and thereby tend to produce correspondingly clearer vibratory effect upon these walls whose vibration intensifies the vibration of the air body within the resonator. For the purpose, furthermore, of obtaining the full effect of the vibration of these separated air bodies and of each of them in all four transverse directions, there is provided mounted within the amplifier and resonator,

6, at the discharge end of the elbow connecting member, 5^b, that is, immediately beyond its wide discharge mouth at the wider end of the deflecting and partitioning device, 8, a resonating device comprising two wooden partitions, 10—10, which are framed together by means of side pieces, 11—11, which fit snugly within the amplifier and resonator, as seen in Fig. 3. These partitions extend in the direction of the greater transverse dimension of the transversely oblong amplifier and resonator, cross-wise of the direction of the edge of the wedge-shaped deflector, 8, and thereby partition off the total space in said narrower end of the amplifier into two volumes at the upper and lower side respectively, as indicated at *a* and *b*. The wedge-shaped deflecting device, 8, extending the greater dimension of its wider end crosswise of the adjacent end of the partitions, 10—10, obstructs the middle portion of the width of each of these volumes contained respectively between the two partitions, 10—10, and between them respectively and the upper and lower walls of the amplifier; and thus by the cooperation of the partition, 10—10, and the deflecting device, 8, the sound vibrations are excluded substantially from the central portion of the volume of the narrower end portion of the amplifier, 6, and limited to volumes adjacent to the four sides at least for the distance along the length of the amplifier through which the partitions, 10—10, extend. The rate of widening of the amplifier in both its transverse dimensions increases rapidly beyond the outer ends of the partitions, 10, permitting the amplification of the sound waves issuing through the four volumes indicated, adjacent the four sides of the amplifier, the sound waves blending as they are amplified in this space and being reinforced by the vibration of the four walls of amplifier and resonator itself, as well as by the vibration of the two partitions, 10—10, with the result that the sound issuing from the wide mouth of the amplifier is stronger and of purer tone, less affected by the blunting or muffling which is noticeable when the sound is projected through a tapering horn mouth in which the entire volume of air therein is put into vibration as a unitary volume.

I claim:—

1. In a sound-reproducing device, a sound conduit comprising an amplifier and resonator of which the terminal discharge member is tapered widening at an increasing angle toward the discharge, in combination with resonating partitions rigidly fixed within the narrower less rapidly tapering portion of the amplifier and terminating at a distance back from its wide discharge end.

2. In a sound-reproducing instrument, a sound conduit comprising an amplifier and

resonator having a discharge terminal which is tapered at the discharge end at a wider angle in one axial plane and at a narrower angle in an axial plane transverse to the first, in combination with two partitions located in the narrower tapering portion of said terminal extending in planes having the

general direction of the axial plane of wider taper.

In testimony whereof, I have hereunto set 10
my hand at Steger, Illinois, this 7th day of
October, 1916.

CARL STEIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

TALKING MACHINE SOUND BOX AND REPRODUCER.

1,261,218 ----- P. B. Delany,
Filed May 7, 1917,
Patented Apr. 2, 1918.

P. B. DELANY.
TALKING MACHINE SOUND BOX AND REPRODUCER,
APPLICATION FILED MAY 7, 1917.

1,261,218.

Patented Apr. 2, 1918.

Fig. 1.

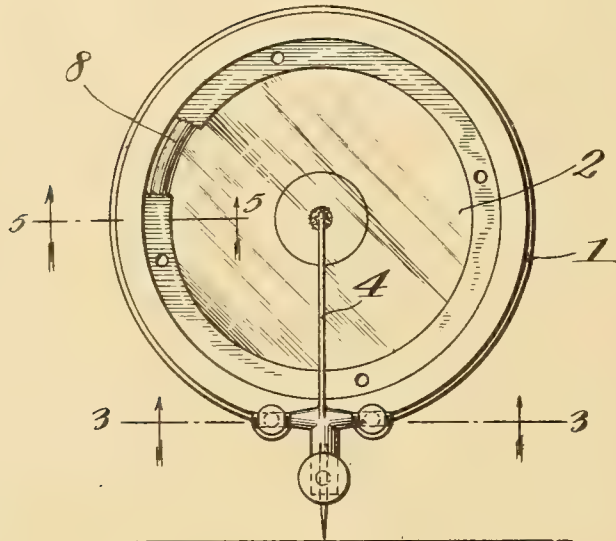


Fig. 2.

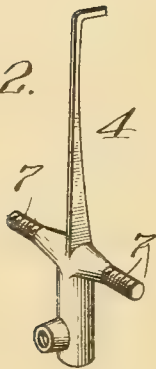


Fig. 4.

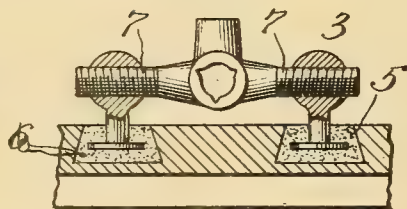


Fig. 5.

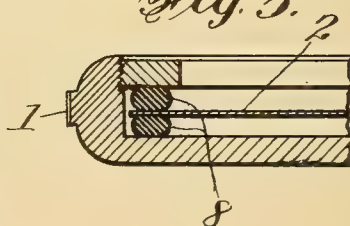


Fig. 3.

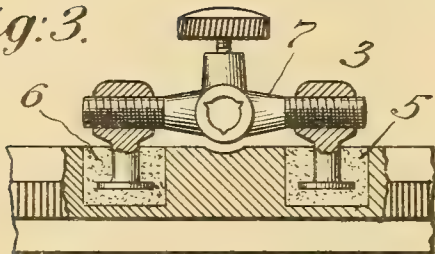


Fig. 6.

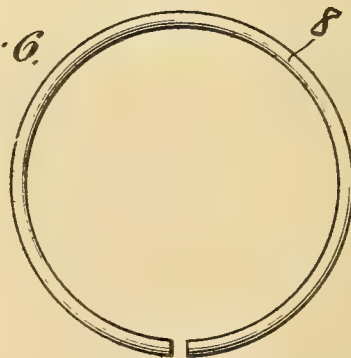


Fig. 7.



Inventor
Patrick B. Delany.
By his Attorneys

Baldwin & Wight

UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF SOUTH ORANGE, NEW JERSEY.

TALKING-MACHINE SOUND BOX AND REPRODUCER.

1,261,218.

Specification of Letters Patent.

Patented Apr. 2, 1918.

Application filed May 7, 1917. Serial No. 166,951.

To all whom it may concern:

Be it known that I, PATRICK B. DELANY, a citizen of the United States, residing at South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Talking-Machine Sound Boxes and Reproducers, of which the following is a specification.

My invention contemplates certain improvements in talking machine sound boxes and reproducers.

As illustrated in the accompanying drawing, Figure 1 is a face view of the sound box complete. Fig. 2 is a perspective of the vibrating arm detached. Fig. 3 is a section on line 3—3, Fig. 1. Fig. 4 differs slightly from the illustration of Fig. 3 in that it shows the threaded engagement between the cruciform vibrating arm and its supports having right and left threads. Fig. 5 is a section on line 5—5, Fig. 1. Fig. 6 shows one of the gaskets between which the diaphragm is mounted. Fig. 7 is a cross section of Fig. 6.

Referring to the drawing I have shown a casing 1 inclosing the diaphragm 2 and furnishing a base for the supports 3 on which the vibrating needle carrying arm 4 is mounted.

These arm supports are shown mounted in recesses 5 which may be of rectangular form as in Fig. 3 or cone shaped as in Fig. 4. The recesses are adapted to contain a meltable composition 6 which may consist of any preferred ingredients. I have found that a composition of tar, resin, and gutta percha produces satisfactory results, preferably by combining three parts of gutta percha to one part each of the tar and resin.

The supports 3 are interiorly threaded to receive the lateral arms 7 of the arm 4 and this threaded engagement may be straight or continuous as in Fig. 3 or by right and left threads as in Fig. 4.

As shown in detail in Fig. 5 the diaphragm 2 is mounted between gaskets 8 which are preferably made of the above described composition 6.

From the foregoing it will be apparent that the main idea of my invention is to enhance the powers of reproduction by providing a maximum freedom of movement of the vibrating arm within certain limits. This is accomplished by rigidly securing the supports 3 in a meltable mass and mounting

the arm to swing in the supports with the least possible resistance by friction. With the arm mounted in the supports the composition, in a plastic state, is poured into the recesses 5. Hence before becoming rigid the supports conform in position to the requirements of the arms 7. This position is permanently maintained when the composition hardens and insures a free movement of the arm and an even pressure upon the diaphragm. Furthermore there being no mechanical adjusting parts a user cannot tamper with the needle and destroy its efficiency.

The gaskets 8 have been found more durable than the rubber gaskets usually employed.

I have found that the slight movement of the arm in the threaded supports furnishes a cushion against the rattling of the arm due to coarse vibrations and that the right and left thread embodiment of Fig. 4 is especially adapted to the attainment of this result by putting a brake on any tendency of the arm to get beyond control laterally arising from any defect in the walls of the record groove produced by wear.

It will be observed that the supports 3 are separate members and are separately secured to the frame of the sound box. In this way a very accurate adjustment of the supports may be obtained. Furthermore, inasmuch as the supports are secured to the box by masses of a meltable material the supports may be mounted while the material is soft and accurately adjusted before the masses harden. When the masses do harden the supports and the parts connected therewith are permanently held in proper condition for accurate operation. The masses of meltable material also serve to insulate the working parts of the device from vibrations of the sound box frame or casing.

I claim as my invention:

1. In a sound box, a vibrating arm having screw-threaded extensions projecting laterally from and movable with said arm, and supports for said extensions having threaded portions with which said extensions engage and in which they turn.

2. In a sound box, a vibrating arm having screw-threaded extensions projecting laterally from and movable with said arm, and independently adjustable supports for said extensions having threaded portions with

which said extensions engage and in which they turn.

3. In a sound box, a vibrating arm having screw-threaded extensions projecting later-
5 ally from and movable with said arm, and supports for said extensions independently attached to the frame of the sound box and having threaded portions with which said
10 extensions engage and in which they turn.
4. In a sound box, a vibrating arm having lateral extensions, supports in the outer ends
on which the extensions are mounted to turn, and masses of a meltable composition fixed
in the frame of the sound box in which the

inner ends of the supports are adjusted and 15 embedded.

5. In a talking machine sound box, a diaphragm, a vibrating arm attached to said diaphragm, screw-threaded lateral ex-
tensions on said arm, one of said extensions 20 having a right-handed screw-thread, the other of said extensions having a left handed screw-thread, and corresponding screw-threaded supports having threaded engage-
25 ment with said extensions.

In testimony whereof, I have hereunto subscribed my name.

PATRICK B. DELANY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

(GRAPHIC PHONE PATENT)
1,261,541

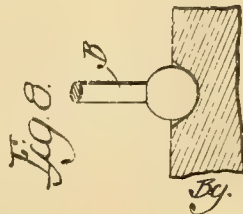
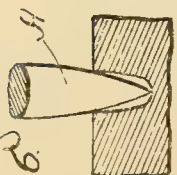
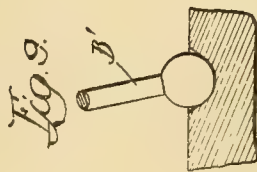
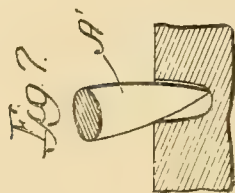
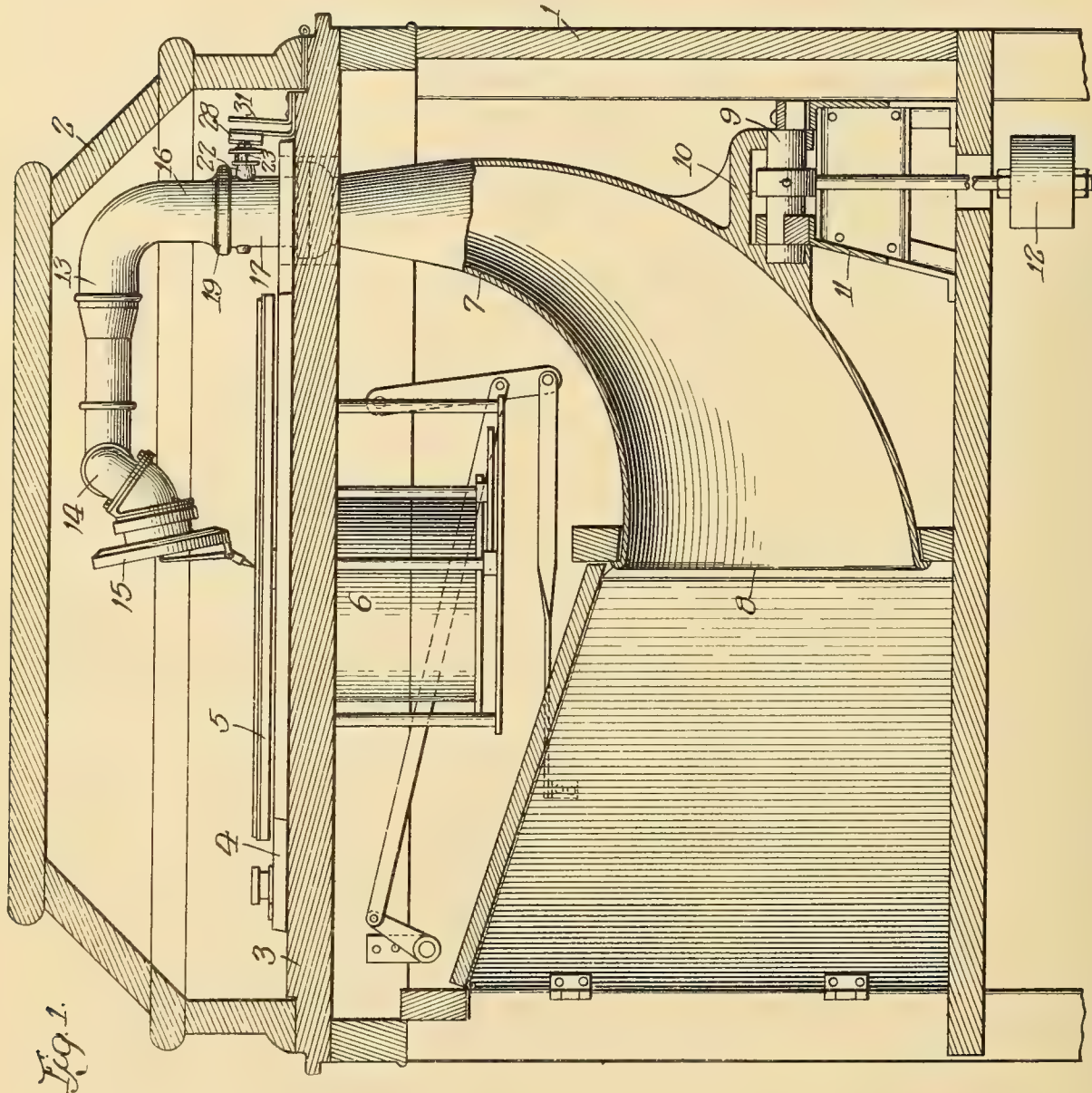
SOUND CONVEYOR FOR TALKING MACHINES.

1,261,541 ----- A. A. Huseby,
Patented Apr. 2, 1918,
Filed July 5, 1917.

A. A. HUSEBY.
SOUND CONVEYER FOR TALKING MACHINES.
APPLICATION FILED JULY 5, 1917.

1,261,541.

Patented Apr. 2, 1918.
2 SHEETS—SHEET 1.



Witnesses:

Ed. Larson
C. H. Rosner.

Inventor
Albert A. Huseby.

Pond & Wilson
Attys

A. A. HUSEBY.
SOUND CONVEYER FOR TALKING MACHINES.
APPLICATION FILED JULY 5, 1917.

1,261,541.

Patented Apr. 2, 1918.
2 SHEETS—SHEET 2.

Fig. 2.

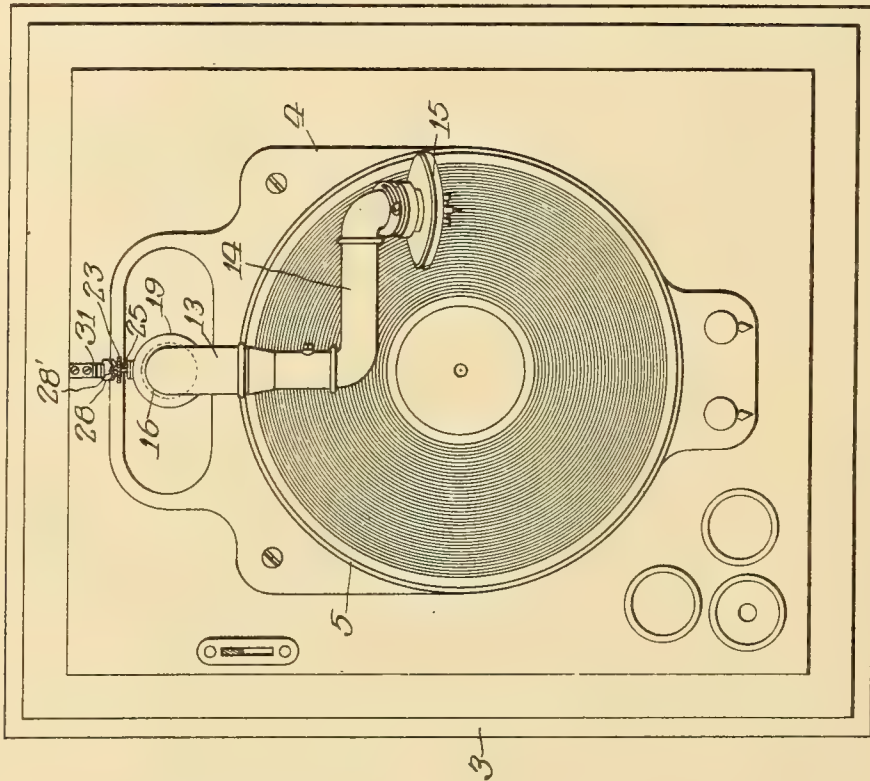


Fig. 5.

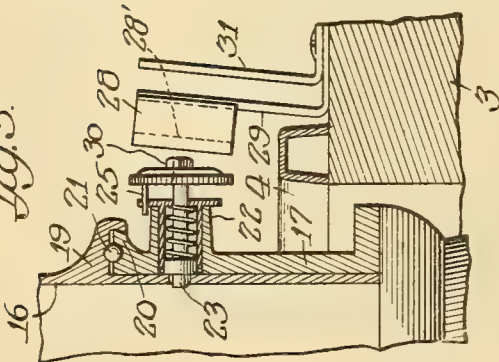


Fig. 3.

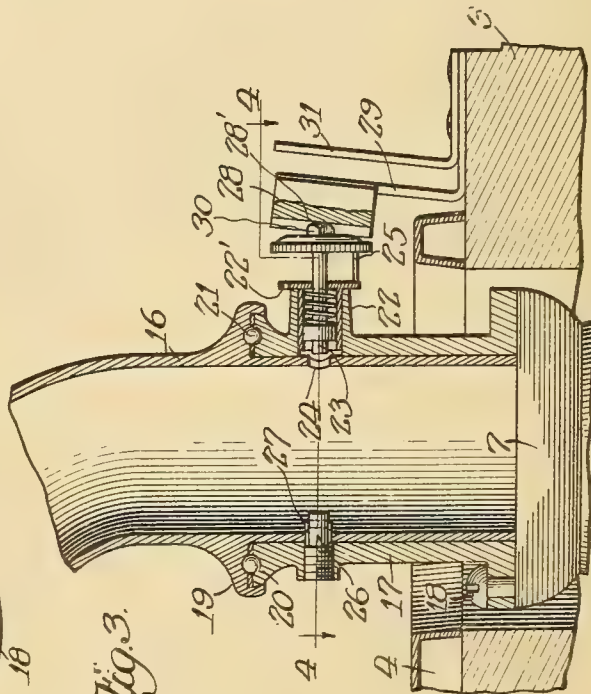
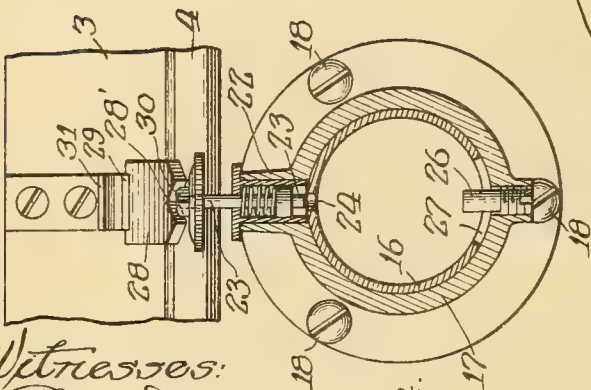


Fig. 4.



Witnesses:
Ed. Davison
C. H. Rosner.

Inventor:
Albert A. Huseby
By Tond & Wilson,
Attys.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

SOUND-CONVEYER FOR TALKING-MACHINES.

1,261,541.

Specification of Letters Patent. Patented Apr. 2, 1918.

Application filed July 5, 1917. Serial No. 178,658.

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sound-Conveyers for Talking-Machines, of which the following is a specification.

This invention relates to improvements in sound conveyers for talking machines, and the chief purpose or object of the invention is to provide a sound conveyer that shall be capable not only of playing both laterally and vertically cut records, but of playing each of the said types in the most scientifically correct manner to secure the purest and most perfect reproduction of the record by the machine.

In Letters Patent No. 1,198,636, granted to me September 19, 1916, I have disclosed a sound conveyer comprising a lower, generally upright portion having a downwardly and forwardly curved form, and an upper, generally horizontal tone-arm portion rigidly mounted on and secured to said lower portion, the entire structure being supported, with capacity for lateral swinging movement, on a single horizontal pivot the axis of which is coincident with the center of the vertical delivery mouth of the lower portion of the conveyer. I have found that a sound conveyer of this construction is excellently adapted to the playing of disk records of the laterally undulating groove type by reason of the fact that the point of the needle travels in a straight line radially of the record disk while the needle itself is always in a vertical plane that is substantially tangential to the groove at the point of engagement of the groove by the needle. On the other hand, I have found that for the playing of disk records of the vertically undulating or hill and dale type the above described construction does not yield as good results as are obtained by the generally used vertically pivoted tone-arm swinging in a horizontal plane wherein the point of the needle travels in an arc of a circle across the face of the record disk. The hill and dale record, of course, imparts a vertical vibration to the whole sound-box which is wholly lacking in the other type of record, and this creates a tendency for the point of the needle to jump out of the groove especially when playing records having very steep or abrupt elevations and depressions;

and this tendency, as I have found by numerous experiments is more pronounced in the case of the construction of my prior patent above referred to than in the case of the vertically pivoted tone-arm.

My present invention is the result of a long effort and search to obtain, in a talking machine, a sound conveyer construction which, when equipped with a convertible sound-box, would play each of the two types of record in the most nearly ideal manner and would yield the most nearly perfect results.

In order that my present invention, its mode of operation and advantages may be readily understood by those skilled in the art, I have illustrated in the accompanying drawings one practical and preferred embodiment thereof, and referring thereto—

Figure 1 is a vertical section through the upper portion of a talking machine cabinet, with certain of the interior parts appearing in section and others in elevation;

Fig. 2 is a top plan view with the lid removed;

Fig. 3 is a detail view on an enlarged scale in vertical section through the joint between the upper and lower sections of the sound conveyer;

Fig. 4 is a horizontal section on the offset line 4—4 of Fig. 3;

Fig. 5 is a fragmentary vertical section similar to Fig. 3, but illustrating the locked position of the two sections of the sound conveyer;

Figs. 6 and 7 are detail views in the nature of diagrams designed to illustrate the different relations of the needle and record groove of a laterally cut record where the point of the needle moves in a radial line and where it moves in the arc of a circle over the face of the record;

Figs. 8 and 9 are views similar to Figs. 6 and 7 respectively and illustrate the relations of the needle and groove of a vertically cut record where the needle moves radially and where it moves in the arc of a circle over the face of the record.

First briefly describing the principal parts with which my improved sound conveyer co-operates, 1 designates as an entirety the upper portion of the box or cabinet in which the principal parts of the mechanism are housed, and 2 designates the hinged lid or cover. Mounted on the top wall 3 of the case is a metal plate 4 in which is rotatably

mounted the usual turntable 5 driven by a spring motor conventionally illustrated at 6, these parts being of ordinary or usual construction.

7 designates the generally-upright portion of the sound conveyer, the same consisting of a downwardly and forwardly curved tapered or flaring member that terminates at its lower end in a vertical delivery mouth 8. This member 7 is pivotally mounted for lateral swinging movement by means of a pivot shaft 9 carried by a rearwardly extending lug or bracket 10, said shaft having knife-edge bearings in a suitable support 11, and carrying a counterweight 12 suspended therefrom, by which the lateral swinging movements of the entire sound conveyer are counterbalanced. For a more detailed description of the pivotal mounting of the member 7, reference may be had to my former patent above referred to.

13 designates as an entirety the upper horizontal tone-arm portion of the sound conveyer, in the forward end of which is swiveled an angularly projecting extension 14 carrying the sound box 15. The tone arm 13 is also formed with a downwardly turned portion 16, the lower end of which, as most clearly shown in Fig. 3, fits into a sleeve member 17 that is rigidly secured on the upper end of the lower section 7, as by screws 18, and virtually forms a part or extension of said lower section 7. The vertical end portion 16 of the tone-arm 13 and the upper end of the sleeve 17 are formed with mating flanges 19 and 20, respectively, the meeting faces of which are concave, forming a ball-race for an anti-friction bearing 21. On the sleeve 17 is a hollow lateral lug 22 in which is slidably mounted a spring-actuated locking bolt 23, the inner end of which is movable into and out of engagement with a hole 24 in the wall of the member 16. The head of the bolt 23 carries an inwardly projecting pin 25, which, when the bolt is in locking position, enters a hole 22' in the outer edge of the lug 22, but which, when the bolt is retracted and turned slightly, bears against the outer edge of the lug 22 and holds the bolt in unlocking position, permitting a free relative swiveling movement of the tone arm on the lower section of the sound conveyer.

The two sections of the sound conveyer are confined against lengthwise separation by means of a pin 26 mounted in the sleeve 17 and engaging a slot 27 in the member 16, which slot is of sufficient length to accommodate the maximum angular swing of the tone-arm 13 in playing a record.

When it is desired to play a laterally cut record, the bolt 23 is left in locking position as shown in Fig. 5, at which time the upper and lower sections of the sound conveyer are rigidly connected and the upper section

has only the swinging movement imparted to it by the lower section. At this time the sound box is turned through an angle of 90° from the position shown in Figs. 1 and 2, in which position the sound box is adapted for the playing of a laterally cut record. During the playing of the record the point of the needle travels in a straight radial line over the face of the record, owing to the fact that the sound conveyer as a whole swings only on its horizontal pivot. When, however, it is desired to play a record of the vertically cut or hill and dale type, the locking bolt 23 is withdrawn and turned slightly so as to hold it out of locking position through engagement of the pin 25 with the edge or flange of the lug 22, and this leaves the upper or tone-arm section free to swing in a horizontal plane on the vertical joint of the sound conveyer. At this time the sound-box is turned to the position shown in Figs. 1 and 2 for the playing of a vertically cut record, and the lower section of the sound conveyer is locked against swinging movement on the horizontal pivot by means of a catch block 28 mounted on a spring arm 29 that is secured at its lower end to the wall 3 just in rear of the vertical joint of the sound conveyer. This catch block 28 has a vertical groove or recessed face 28', best shown in Fig. 4, that engages a nut 30 on the outer end of the locking bolt 23 with sufficient force to resist displacement under the swinging movement of the upper or tone-arm section of the sound conveyer. In rear of the block 28 and its arm 29 is preferably located a guard post 31 designed to limit the backward swing of the spring arm 29 and prevent it from being bent back too far to be operative through accident or otherwise. From this it will be seen that the retraction of the locking bolt so as to leave the tone-arm free to swing on the lower section of the sound conveyer simultaneously places the head of the locking bolt in position to cooperate with the catch 28 to thereby lock the lower section of the sound conveyer against swinging movement; and, conversely, when the locking bolt is allowed to return to locking position, the lower section of the sound conveyer is simultaneously released so as to be capable of swinging on the horizontal pivot.

Figs 6 and 7 are comparative views intended to illustrate the advantage, in the playing of a laterally cut record, of the herein described construction wherein the needle travels in a straight radial line across the face of the record over the construction wherein the needle, carried at the free end of a vertically pivoted horizontally swinging tone-arm, travels in the arc of a circle across the face of the record. In both cases the needle is inclined at an angle of about sixty degrees to the surface of the record

disk; but in the former case the vertical plane in which the needle lies is always tangential to the groove at the point of contact so that the extreme lower point of the needle engages the bottom of the groove centrally thereof, as shown by the needle A in Fig. 6, while in the latter case the vertical plane in which the needle lies is not tangential to the groove at the point of contact but cuts across the groove at a sharp angle, this angle increasing from the innermost to the outermost turn of the spirally formed groove. The result of this is that the groove-engaging portion of the needle cants or tilts slightly transversely of the groove, as shown by the needle A' in Fig. 7, the extreme point of the needle tending to climb the outer wall of the groove, and the inner side of the needle hugging the inner wall of the groove with undue friction. This is the principal cause of the scratching and hissing noise that accompanies the playing of laterally cut records with the use of a vertically pivoted horizontally swinging tone-arm. In my present construction which permits the needle, when playing a laterally cut record, to be always in a vertical plane that is tangential to the groove at the point of contact and to travel in a straight radial line across the face of the disk, this disagreeable scratching and hissing noise is almost entirely eliminated.

Vertically cut records, such as the Pathé, have comparatively shallow grooves that are substantially semi-circular in cross-section; and the needle or stylus has a tip in the form of a tiny jewel of spherical or ball shape, the lower half of which substantially fills the cross-section of the groove, as shown in Figs. 8 and 9. In this case it will be manifest that so far as correct engagement of the tip of the needle with the groove is concerned it is immaterial whether the needle is always in a vertical plane that is tangential to the groove, as indicated by the needle B in Fig. 8, or lies in a vertical plane that more or less cuts across the groove, as indicated by the needle B' in Fig. 9, since in the latter case the canting or tilting of the needle merely turns the ball-shaped point slightly in its substantially concentric socket or seat in the groove without any effect on the working relation between the two. But, as I have hereinbefore stated, the most perfect results in playing the vertically cut records are obtained by swinging the tone-arm only on the vertical pivot or joint of the sound conveyer, since this method is not attended by faulty tracking of the needle in the groove, and hence I equip the machine with the described means for locking the lower section of the sound conveyer against swinging movement when playing this type of record. By coördinating or combining the joint-locking and the section-locking

means so that when the former is unlocked the latter is locked and vice versa, I provide a very simple and expeditious means for effectuating the stated objects of the invention.

I claim:

1. In a talking machine, a sound conveyer comprising a generally upright lower portion mounted on a horizontal pivot, a generally horizontal tone-arm portion vertically swiveled on the upper end of said lower portion, means for locking said portions rigidly together for the playing of laterally cut records, and means for holding said lower portion stationary when said locking means is in unlocking position so as to permit a swinging movement of said tone-arm portion on said upright lower portion for the playing of vertically cut records.

2. In a talking machine, a sound conveyer comprising a generally upright lower portion mounted on a horizontal pivot, a generally horizontal tone-arm portion vertically swiveled on the upper end of said lower portion, means for locking said portions rigidly together for the playing of laterally cut records, and means coöperating with said locking means in the unlocking position of the latter for holding said lower portion stationary so as to permit a swinging movement of said tone-arm portion on said upright lower portion for the playing of vertically cut records.

3. In a talking machine, a sound conveyer comprising a generally upright lower portion mounted on a horizontal pivot, a generally horizontal tone-arm portion provided with a downwardly turned rear end that forms a vertical swivel joint with the upper end of said lower portion, a sliding bolt engaging the parts of said swivel joint to lock them against relative turning movement, and a catch coöperating with said bolt when the latter is withdrawn from locking position to hold said lower portion against swinging movement on its horizontal pivot.

4. In a talking machine, a sound conveyer comprising a generally upright lower portion mounted on a horizontal pivot, a generally horizontal tone-arm portion provided with a downwardly turned rear end that forms a vertical swivel joint with the upper end of said lower portion, a sliding bolt engaging the parts of said swivel joint to lock them against relative turning movement and a spring catch automatically engaging the head of said bolt when the latter is retracted and the said lower portion of the sound conveyer is swung to its central position to hold the latter against swinging movement on its horizontal pivot.

5. In a talking machine, a sound conveyer comprising a generally upright lower portion mounted on a horizontal pivot, a generally horizontal tone-arm portion provided

with a downwardly turned rear end that forms a vertical swivel joint with the upper end of said lower portion, a spring-pressed sliding bolt engaging the parts of said swivel joint to lock them against relative turning movement, means for holding said bolt in retracted position, and a spring catch automatically engaging the head of said bolt when the latter is retracted and the said lower portion of the sound conveyer is swung to its central position to hold the latter against swinging movement on its horizontal pivot.

6. In a talking machine, a sound conveyer comprising a generally upright lower portion mounted on a horizontal pivot, a generally horizontal tone-arm portion provided

with a downwardly turned rear end that forms a vertical swivel joint with the upper end of said lower portion, a spring-pressed sliding bolt engaging the parts of said swivel joint to lock them against relative turning movement, means for holding said bolt in retracted position, an upright spring arm in rear of said bolt, a catch-block carried by said arm and adapted to automatically engage the head of said bolt when the latter is retracted and the said lower portion of the sound conveyer is swung to its central position to hold the latter against swinging movement on its horizontal pivot, and a guard in rear of said arm to limit the backward bending movement of the latter.

ALBERT A. HUSEBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH LIGHT.

1,261,667 ----- W. G. Winter,
Filed Oct. 12, 1917,
Patented Apr. 2, 1918.

W. G. WINTER.
 PHONOGRAPH LIGHT.
 APPLICATION FILED OCT. 12, 1917.

1,261,667.

Patented Apr. 2, 1918.

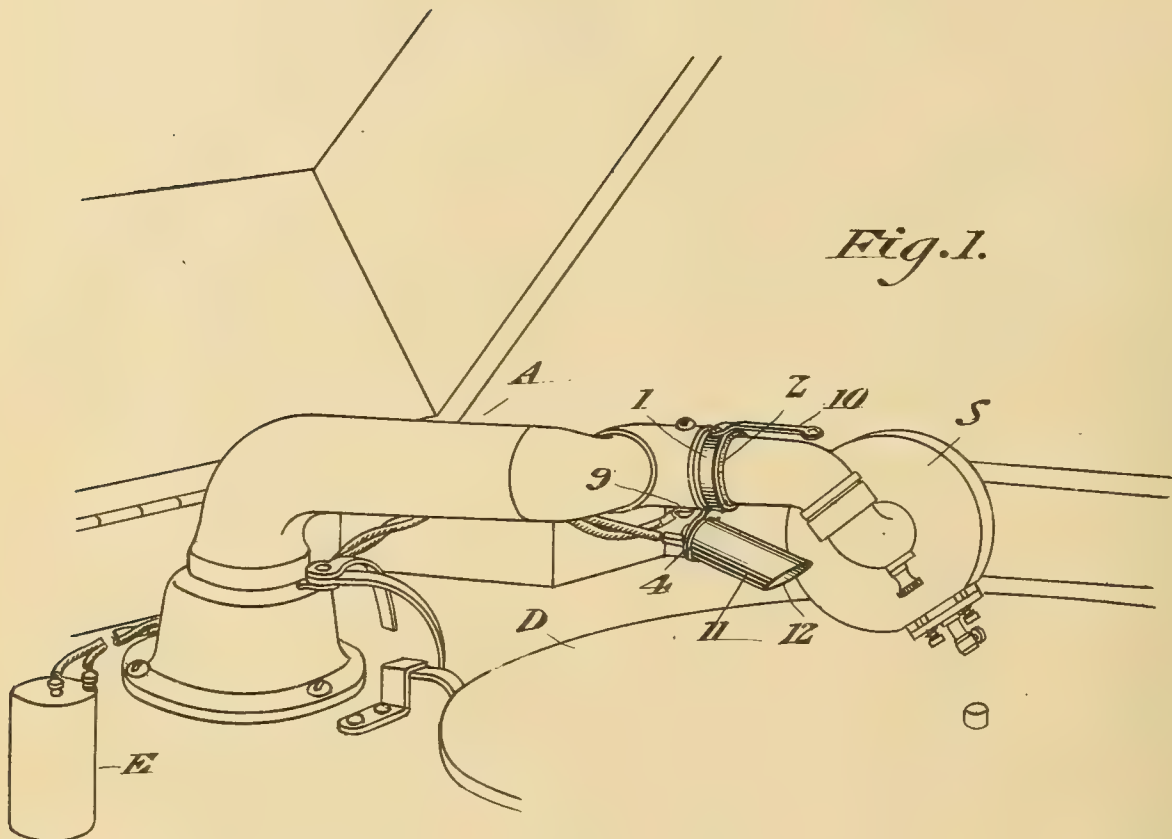


Fig. 1.

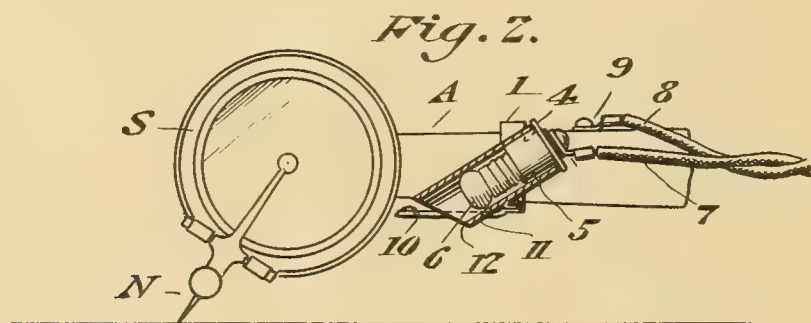


Fig. 2.

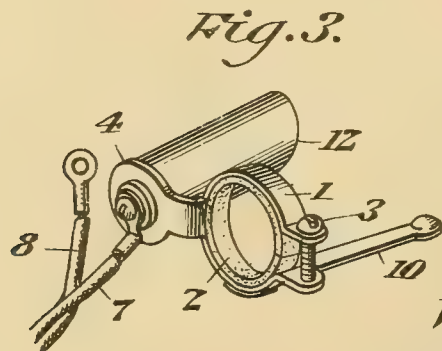


Fig. 3.

WITNESSES

M. D. Nye
N. L. Lottman

INVENTOR

W. G. Winter
 BY *Victor J. Evans*

ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM G. WINTER, OF ST. LOUIS, MISSOURI.

PHONOGRAPH-LIGHT.

1,261,667.

Specification of Letters Patent.

Patented Apr. 2, 1918.

Application filed October 12, 1917. Serial No. 196,218.

To all whom it may concern:

Be it known that I, WILLIAM G. WINTER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented new and useful Improvements in Phonograph-Lights, of which the following is a specification.

This invention relates to illumination, and more especially to a combined light and structure for furniture—particularly for grafonolas, victrolas, and other musical instruments of the same nature wherein the needle is frequently adjusted and changed.

The purpose of the invention is to provide a small electric light mounted in a support which is clamped on the pivoted tone arm, including connections with a suitable source of electricity and a circuit closer adapted to be actuated by one hand as it grasps said tone arm, while the other hand is free to remove such needle and insert a new one.

Structural details of the device as adapted for one musical instrument of this type are set forth below, reference being had to the drawings wherein—

Figure 1 is a general perspective view of my invention as applied to a graphophone.

Fig. 2 is a side elevation of the tone arm of a Columbia machine with the reproducer, showing my attachment applied and the tubular guard in section.

Fig. 3 is an enlarged detail of the attachment removed.

In the drawings we may assume that A is the swinging portion or tone arm of the instrument, S the sound box, and D the disk, and the letter N designates the position of the needle which is mounted in a holder as well understood.

My attachment comprises a spring clip or split ring 1 lined with felt or other soft insulator 2 and having its ends outturned and connected by a screw 3 which may be set up to fasten the clip on the tone arm; a bracket 4 depends from this clip and carries a lamp socket 5 into which is screwed a pea light 6, and two wires 7 and 8 lead respectively from the central terminal within the socket

and from a point 9 in contact with the tone arm, to a source of electricity designated at E. Through these wires the current flows into the socket and into the arm. The clip has a spring finger 10 overlying and normally out of contact with the arm, and when the tip of this finger is pressed into contact therewith, the circuit is completed and the lamp illuminated. As well known, the left hand usually grasps the tone arm while the right hand is adjusting and changing the needle.

Mounted over and around the socket is a tubular guard 11 preferably long enough to project entirely beyond the light and also having its front end preferably beveled off as at 12, and by adjusting this guard the light may be directed exactly as required by the user. Of course the bracket which connects the clip and socket may be bent at the time the attachment is applied, and the attachment will be applied at such point that this bending and adjusting of the same will direct the light onto the needle holder and the disk where it will not shine in the eyes of the operator or in the faces of any spectators who might be seated in the room or on a darkened porch. The entire attachment is so light that it is carried by the tone arm without interfering with the action of the same in the least particular. For a small lamp of perhaps four volts, a single dry cell will be sufficient and the same may be stored in a remote part of the casing and the wires led thereto in a manner not necessary to explain in detail. Devices of somewhat the same character have heretofore been mounted on the goose neck or on the sound box, but they had the objection that they caused the light to shine in the face of the operator when he turned the goose neck back, and they threw some additional weight onto the needle.

What is claimed as new, is—

Means for lighting a phonograph comprising a split ring having its ends projecting outwardly, a screw engaging with said ends for clamping the ring to the tone arm of the phonograph, a felt washer car-

ried by said ring, a bracket connected with
said ring, an electric lamp socket carried
by said bracket, a tubular guard surround-
ing said socket and carried by the bracket,
5 circuit wires connected respectively to one
of the socket terminals and to the arm, and
the other socket terminal being in electrical

connection with the bracket and ring, and
a spring finger connected with the ring and
extending parallel with the arm and adapted 10
to be pressed into engagement therewith to
complete the circuit.

In testimony whereof I affix my signature.
WILLIAM G. WINTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

DEVICE FOR CLEANING PHONOGRAPH RECORDS.

1,261,688 -----J. Bratherton,
Filed June 18, 1917,
Patented Apr. 2, 1918.

J. BRATHERTON.
 DEVICE FOR CLEANING PHONOGRAPH RECORDS.
 APPLICATION FILED JUNE 18, 1917.

1,261,688.

Patented Apr. 2, 1918.

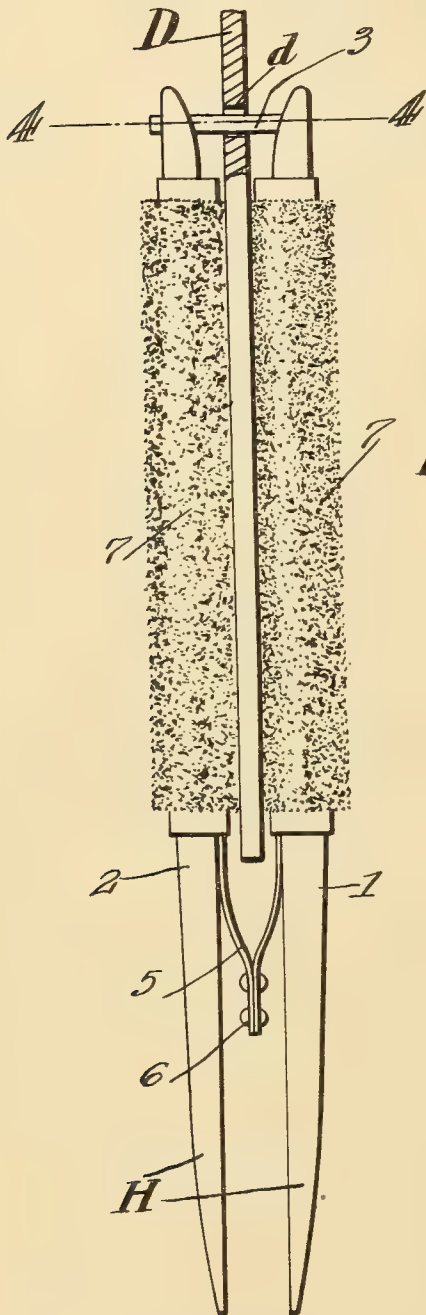


Fig. 1.

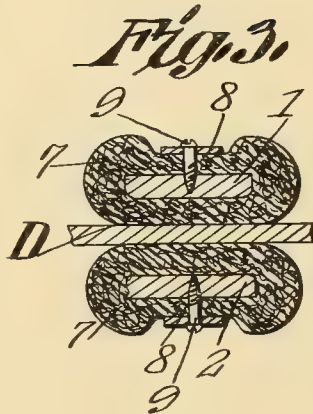


Fig. 4.

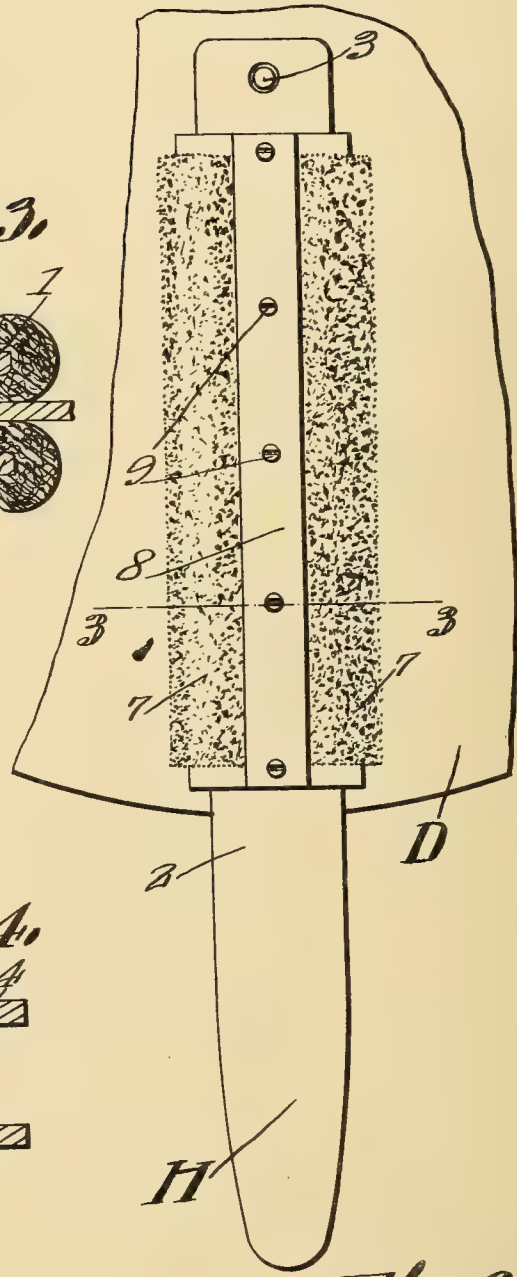
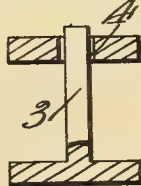


Fig. 2.

Witness

J. R. Gomer
H. R. Mitchell

Inventor

J. Bratherton

By *Chas. Snow & Co.*

Attorney

UNITED STATES PATENT OFFICE.

JAMES BRATHERTON, OF DETROIT, MICHIGAN.

DEVICE FOR CLEANING PHONOGRAPH-RECORDS.

1,261,688.

Specification of Letters Patent.

Patented Apr. 2, 1918.

Application filed June 18, 1917. Serial No. 175,461.

To all whom it may concern:

Be it known that I, JAMES BRATHERTON, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Device for Cleaning Phonograph-Records, of which the following is a specification.

This invention relates to a device to be used in cleaning record disks for phonographs, one of the objects of the invention being to provide a simple efficient and compact device of this character which can be easily placed in and removed from position and which will simultaneously clean both sides of a disk, thus making the device especially adapted to use in connection with double faced disks.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of the parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown:—

In said drawings:—

Figure 1 is a side elevation of the device, the same being shown in position on a record disk which is partly broken away.

Fig. 2 is a face view of the structure shown in Fig. 1.

Fig. 3 is a section on line 3—3 Fig. 2.

Fig. 4 is a section on line 4—4 Fig. 1.

Referring to the figures by characters of reference 1 and 2 designate opposed strips and the inner faces of these strips are rounded at one end so as to diverge outwardly, there being a centering pin 3 extended from one of these rounded faces and adapted to project through an opening 4 in the opposed rounded face.

The other end portion of the strips 1 and 2 are shaped to constitute handles which can be readily grasped.

Secured to the inner face of each of the members 1 and 2 is a leaf spring 5 and these leaf springs are fastened together at one end as indicated at 6. Thus it will be seen that by providing this form of connection between the strips 1 and 2, they can not only swing relative to each other but they can move bodily toward or from each other.

Each of the members 1 and 2 is incased for a portion of its length, with a cleaning element 7 which can be of a heavy plush or of any other suitable material. Each of these sleeves of cleaning material is preferably held in place by a metal strip 8 extending along the outer surface thereof and attached to the strip 1 or 2 by screws 9 or the like as shown particularly in Fig. 3.

In using the device the handle portions 8 are swung toward each other, thus causing the pin 3 to withdraw from the opening 4. A disk D can then be inserted between the strips 1 and 2 until the central opening *d* therein arrives opposite the opening 4. The handles can then be released so as to allow the pin 3 to pass through the opening *d* and enter the opening 4. By reason of the peculiar spring connection between the parts 1 and 2, the sleeves 7 will adjust themselves so as to fit snugly upon opposed faces of the disk D throughout the length of the sleeves. With the sleeves thus pressed yieldingly against the disk, said disk can be rotated between the sleeves, the pin 3 constituting a pivot therefor, and this action will result in both faces of the disk being thoroughly cleaned of dust and other accumulations of matter thereon.

What is claimed is:—

1. A device for cleaning disk records, including opposed cleaning members, a yieldable connection between said members, the said members being movable angularly and bodily relative to each other, and means at the free end of one of the members for entering the opening in the disk record to be cleaned.

2. A device for cleaning disk records, comprising opposed cleaning members, a spring connection between said members.

the said members being movable angularly and bodily relative to each other, handles extending from the members at one end and adjacent said connection, and means extending from one of the members adjacent its other end for entering the opening in a disk record.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES BRATHERTON.

Witnesses:

W. H. HUTTIE,

STEPHEN D. BEUM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND REPRODUCING MACHINE.

1,261,795 ----- C. W. Ebeling,
Filed Aug. 20, 1913,
Patented Apr. 9, 1918.

C. W. EBELING.
SOUND REPRODUCING MACHINE.
APPLICATION FILED AUG. 20, 1913.

1,261,795.

Patented Apr. 9, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

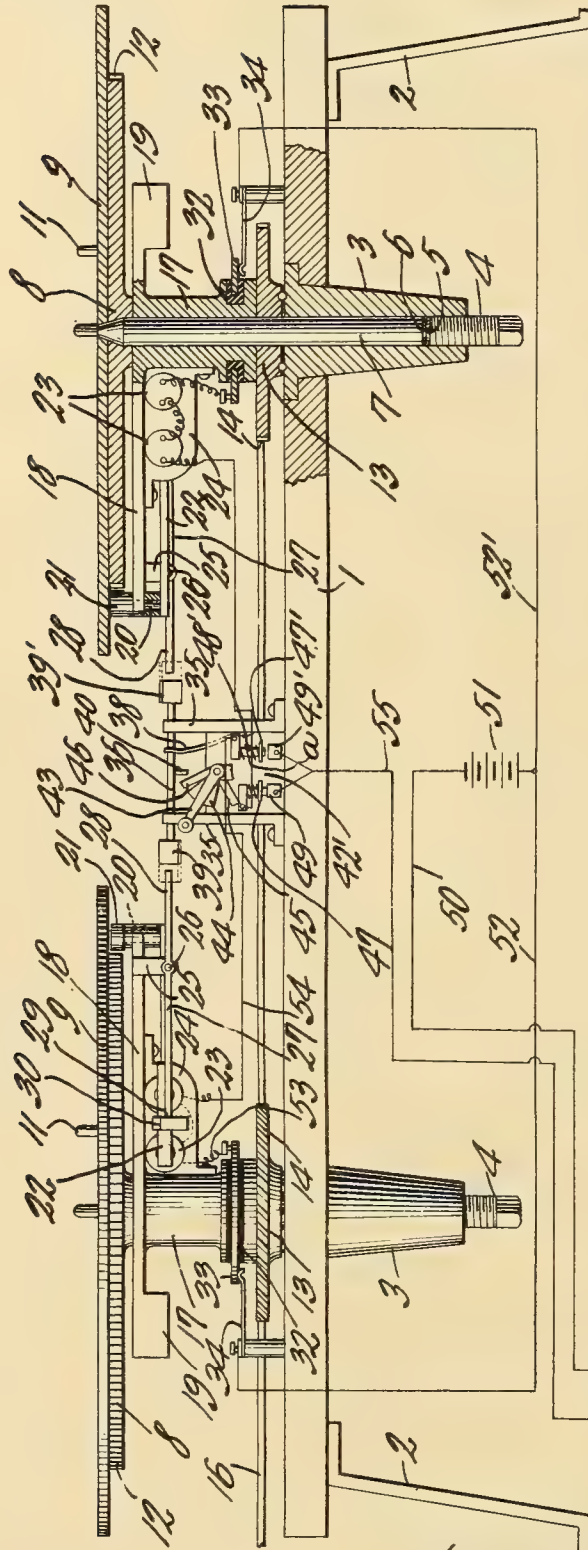


Fig. 2.

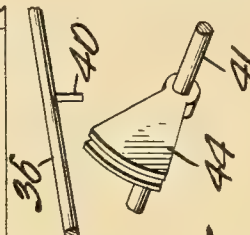


Fig. 3.

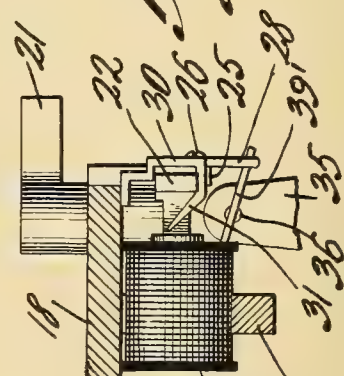
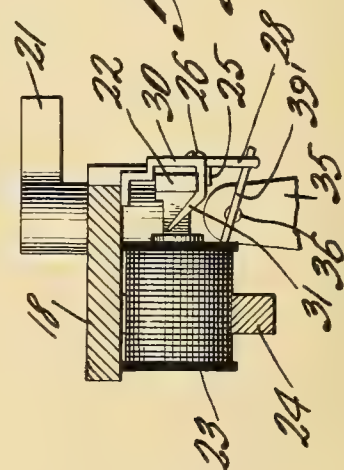


Fig. 4.



Fig. 5.



Witnesses

J. R. Tomlinson
S. Wilkerson

Charles W. Ebeling Inventor
by C. A. Snow & Co. Attorneys

1,261,795.

Patented Apr. 9, 1918.

3 SHEETS—SHEET 2.

Fig. 2.

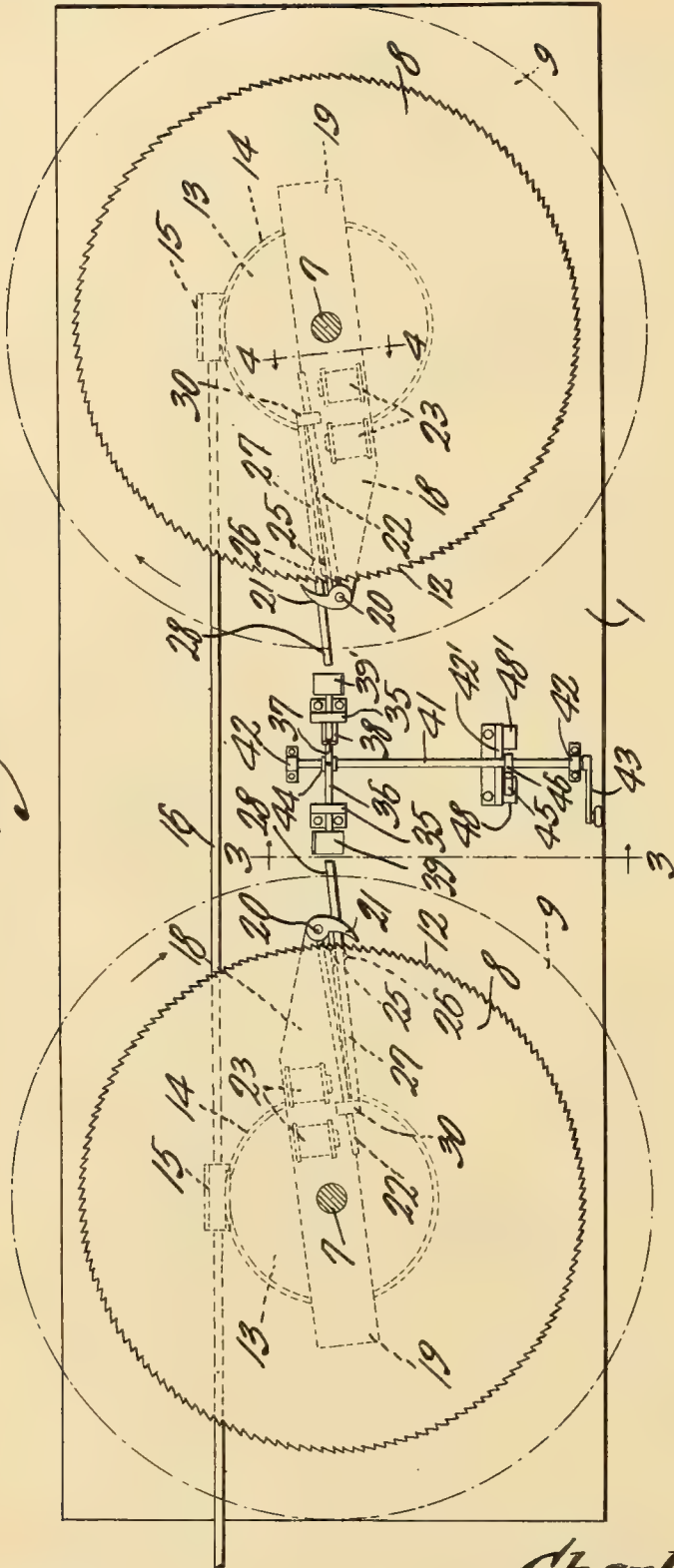


Fig. 6.

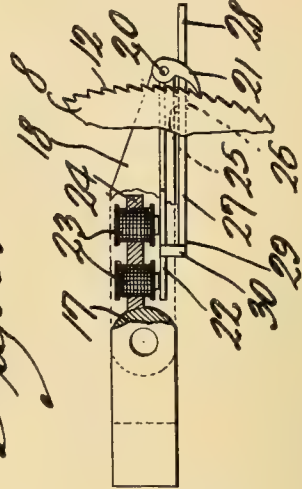
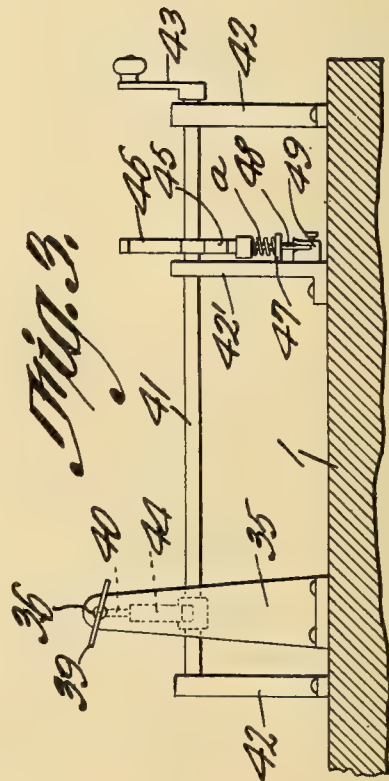


Fig. 3.



Witnesses

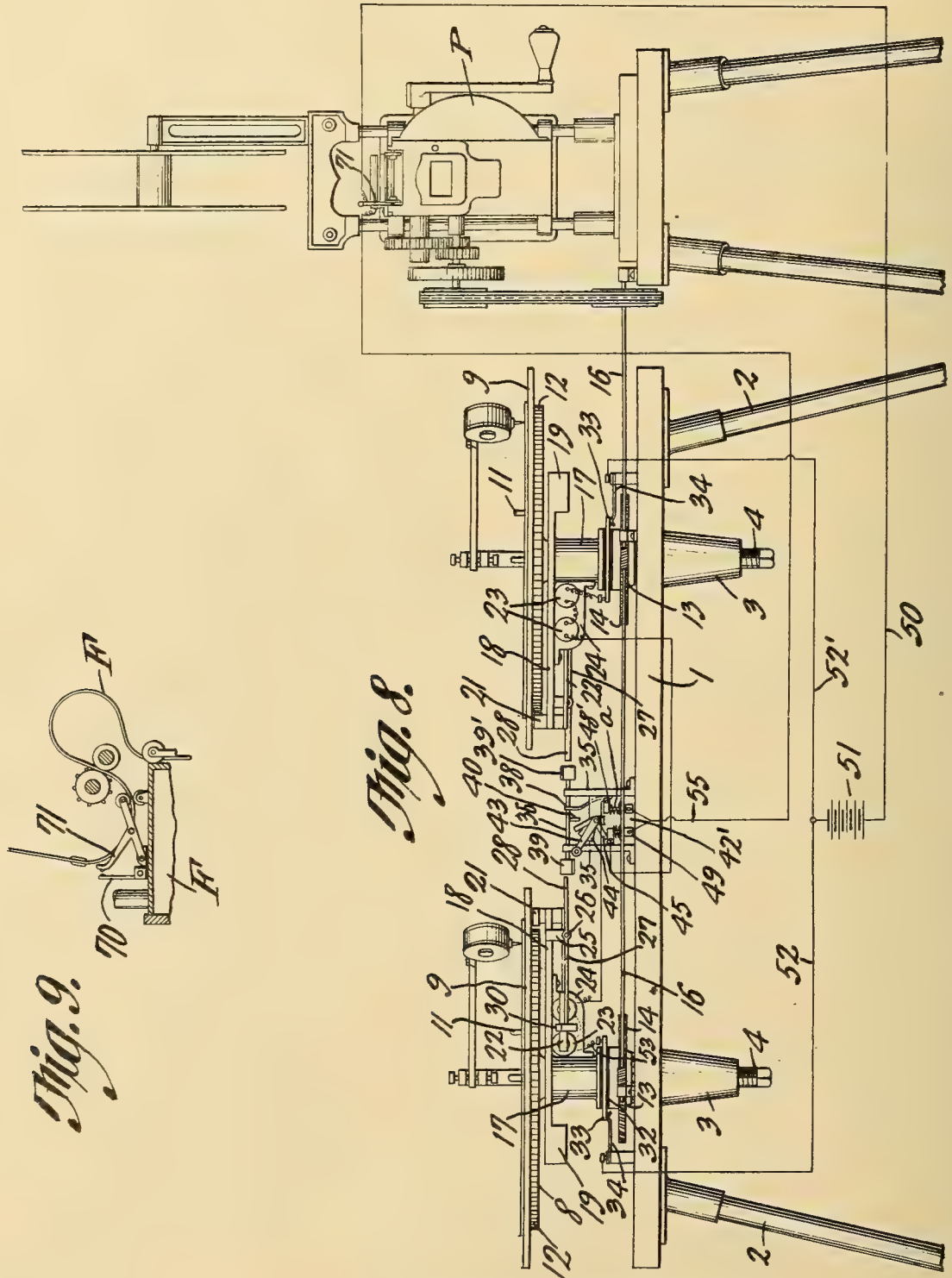
J. R. Tinsley
J. Willow.

Charles W. Ebeling Inventor
by C. A. Snow & Co. Attorneys

1,261,795.

C. W. EBELING.
SOUND REPRODUCING MACHINE.
APPLICATION FILED AUG. 20, 1913.

Patented Apr. 9, 1918.
3 SHEETS—SHEET 3.



Witnesses
J. P. Tomlin
S. Willson

Charles W. Ebeling Inventor
by *C. A. Snow & Co.* Attorneys

UNITED STATES PATENT OFFICE.

CHARLES W. EBELING, OF WHEELING, WEST VIRGINIA.

SOUND-REPRODUCING MACHINE.

1,261,795.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed August 20, 1913. Serial No. 785,804.

To all whom it may concern:

Be it known that I, CHARLES W. EBELING, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Sound-Reproducing Machine, of which the following is a specification.

The present invention relates to improvements in sound reproducing machines, and more particularly to a mechanism whereby the sound record carrier of the sound reproducing machine is operated from a projector mechanism of a motion picture machine, one object of the invention, being the provision of a plurality of such sound carriers with mechanisms for rotating the same selectively, such selected sound record carrier set in operation by the film of the projector, whereby when a plurality of sound records are necessary to properly render the audible part of the scene in connection with the film, such records will be operated in proper synchronism and succession.

A further object of the invention is the provision of a novel mechanism by means of which the connecting medium whereby the record carrier is rotated at the proper time is manually selected to be set in operation and whereby the same is mechanically released when the next succeeding record is started in motion.

In machines of this type, it is essential that there be no slipping between the record and the record carrier, and therefore the record must be placed upon the carrier while the carrier is inert. In the present embodiment, two record carriers are used and each is provided with a clutch mechanism, one member of which is operably connected to the driving mechanism from the projector, both of the sound record carriers therefore being inert until the clutches are operated one at a time to connect its respective carrier to the driving means. By thus making a positive connection, the friction of the stylus upon the record does not tend to hold the record so that a certain amount of circumferential slipping movement between the record and the record carrier will result should the carrier be rotating and the record be inert before the connection between the two is made. It is therefore essential that the record be placed upon a stationary carrier and that the stylus be positioned upon the record while all members are inert.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings—

Figure 1 is a side elevation of the present device applied to two disk record carriers, one of the rotary devices being shown in vertical section.

Fig. 2 is a top plan view of the present device applied to two record carriers.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is a section taken on line 4—4 of Fig. 2.

Fig. 5 is a similar view showing the mechanism for releasing the pawl in its full releasing position.

Fig. 6 is a detail view of the pawl and its magnetic control.

Fig. 7 is an enlarged detailed view of the device for moving the releasing stop in operating position.

Fig. 8 is a view partly in elevation and partly in diagram showing the sound record mechanism operably connected to a motion picture projector.

Fig. 9 is a detail view of the film and contacts actuated thereby.

Referring to the drawings, the numeral 1 designates a platform which is mounted upon standards 2, the platform and standards being indicative of any form of support for the sleeves 3, there being one to each sound record carrier, as is clearly apparent. Disposed on the lower end of each sleeve 3 is a lower thrust screw 4, provided with the reduced upper end 5 for the reception of the lower reduced end 6 of the spindle or shaft 7. This spindle or shaft 7 is projected above the platform 1 and has disposed thereupon the disk 8 and the record carrier or platform 9. The upper reduced end of the shaft 7 constitutes the centering pin for a disk record while the pin 11 is carried by the carrier 9 or engaged within a second aperture of the record, so as to hold the record upon the platform against any independent rotation or sliding movement. The

outer periphery of the disk 8 is provided with the ratchet teeth 12, the purpose of which will presently appear.

Mounted for free rotation about the spindle or shaft 7 above the platform 1, is a disk 13 provided with the gear teeth 14, the gear teeth 14 being in mesh with the worm 15, said worm being carried upon the shaft 16. In the present instance, two worms 15 are carried by the shaft 16, so that the shaft 16 is rotated through any desired mechanism from the projector of a motion picture machine (not shown).

Keyed to and rotatable with the disk 13 of each record carrying mechanism is a sleeve 17, thus the sleeve 17 and the disk 13 are mounted for free rotation about the shaft 7, the upper end of the sleeve 17 being provided with an arm 18, having the counter-balancing weight 19 upon the short end thereof. A vertical pin 20 is mounted in the outer end of the long arm of the member 18, and is disposed to be beyond the teeth 12 of the disk 8, there being carried by such pin, a pawl or detent 21, whose reduced end is disposed to be placed into and out of engagement with the teeth 12.

In order to operate the detent 21 to move its reduced end into and out of engagement with the teeth 12 of its respective record carrying member, a lever armature 22 is connected to the lower end of the pin 20 and is extended to be influenced by the electromagnet 23, which is properly supported from the under side of the arm 18 by means of the strap or other support 24.

It will thus be seen that when the electromagnet 23 is energized, as will later appear, that the lever 22 will be attracted thereto and thus tilt or rock the pin 20 so that the pointed end of the detent 21 will be placed in engagement with the teeth 12 of the disk 8, and thus as the arm 18 is rotated in the direction of the arrow, as shown in Fig. 2, the disk 13 and record carrier platform 9 will be rotated simultaneously therewith.

Any means may be provided for holding the record carrier 9 inert so as to prevent it from rotating due to the friction of the sleeve 17 upon the shaft 7, it not being deemed necessary to illustrate the same in the present device.

In order to provide a means for automatically releasing the pawl 21 from the teeth 12, when the record has been rotated the desired number of times and it is desirable to shift from the record carrier at the left to the one at the right, a lug 25 is carried by the arm 18 adjacent the pin 20, and has pivoted for vertical swinging movement, at 26, the lever 27, the outer end 28 of such lever being disposed beyond and below the periphery of the record carrier 9 and in the path, as will presently appear, to be mechanically actuated so as to

elevate the bracket 30 secured at 29 to the inner end of the lever 27 so that the releasing prong 31 will be moved from the position shown in Fig. 4 to that shown in Fig. 5, and thus move the inner free end of the detent actuating lever 22 away from its electromagnet 23 and consequently remove the pawl 21 from engagement with the gear teeth 12.

As indicated by the arrow at the left in Fig. 2, the outer end 28 of the lever 27, will as it approaches the plate 39, such plate being in the position as shown in dotted lines Fig. 1, strike the under side of said plate, and as said plate 39 is inclined downwardly and in the direction of travel of the lever 27, such end 28 of the lever 27 will ride downwardly and consequently elevate the inner end so that the frame 30 will be elevated and cause the releasing prong 31 to engage the lever 22. The angular disposition of the prong 31 during the elevation of the frame 39 will cause the lever 22 to be moved away from the magnet 23 and consequently as above stated, the pawl 21 will be disengaged from the gear teeth 12.

In order to provide an electrical control for the electromagnet 23 of each of the present record carriers, so that the same may be energized at the proper time and through the instrumentality of the moving film of the projector, the ring 32 of insulation is carried by the sleeve 17, and has disposed therein, a metal disk 33, which constitutes the moving electrical contact of the circuit for controlling its respective electromagnet 23. A spring arm 34 is supported upon the base 1 and has its free end resiliently engaging the under side of the metal disk 33 of each device.

The electrical circuit control will be set forth in detail later on.

In order to provide a means whereby the respective levers 27 will be operated mechanically to release the respective pawls 21, and also to determine which one of the electromagnets 23 will be selectively energized, the same being a manually controlled device, the standards 35, are carried by the platform 1 and have journaled therebetween, the longitudinally slidable shaft 36, said shaft 36 being recessed, as at 37, for the reception of the spring 38, which normally maintains the shaft in such a position, that the two lever actuating plates 39—39' will assume the central neutral position, as clearly illustrated in full lines in Figs. 1 and 2. The pin 40 is connected to the shaft 36 and depends therefrom, and constitutes, as will presently appear, a means whereby the shaft 36 is moved to either extreme position so that its selected plate 39 or 39' may be disposed in the path to engage the free end 28 of its respective pawl releasing lever 27.

A shaft 41 is journaled in the support 42 and extends, as shown, at right angles to the shaft 36, and in a plane therebelow, a plate of insulation 42' being disposed in parallel to the forward support 42 and constituting, as will presently appear, the switch carrying member of the electrical control. A crank 43 is keyed upon the outer end of the shaft 41 so that said shaft may be oscillated manually and consequently oscillate the projecting cam arm 44 keyed upon the shaft 41 and disposed in the path to engage the pin 40 of the shaft 36 to reciprocate the same in either direction and release the shaft from the spring 38. Two switch actuating arms 45 and 46 are keyed upon the shaft 41 between the support 42 and the plate 42' of insulation and are disposed so that their respective free ends, at the proper time, will engage and depress the respective movable switch members 48—48', which are guided in the respective brackets 47—47' connected to the support 42'. These movable members 48—48' are normally elevated by the spring *a*, their lower ends being disposed to move into and out of engagement with the respective contact plates 49—49' to thus complete the selected electrical circuit, as will presently appear.

Assuming that the record carrier at the left in Fig. 1 is operating, the detent 21 being in engagement with the teeth 12, and it is approaching the end of sound rendition of its record, it is therefore desirable to make ready for the operating of the sound record carrier at the right, it having received its record. The shaft 41 is turned to the left, bringing the cam 44 into engagement with the pin 40 and sliding the shaft 36 to the left to place the plate 39 in the path to engage the lever 27 to thus release the lever 22 and pawl 21 of the sound record carrier at its left, the continued movement of the shaft 41, moving the cam 44 beyond the pin 40 and thus releasing the shaft 36 to return to neutral position, and bringing the switch closing arm 45 to close the switch member 48 to thus close and select the electromagnet 23 of the record carrier mechanism at the right.

In order to provide an electrical control for actuating the electromagnet 23, the following circuit connections are employed, but may be deviated from according to the necessitated installation of the present device. The conductor 50 which is led from any suitable means controlled by the projector and preferably through any means connected to and formed in the film thereof, is led to one side of the source of electrical energy 51, in the present instance, shown as a battery, there being connected to the opposite side of the source, the two opposite conductors 52—52'.

As the respective conductors 52—52' constitute a portion of the circuit for controlling the respective electromagnets 23, a description of one complete circuit will suffice for both. Such circuit includes the battery 51, the conductor 52, the spring contact plate 34, the metal ring 33, the conductor 53, the electromagnet 23, the conductor 54, either one of the movable switch members 48—48', either one of the stationary contacts 49—49', the conductor 55, which is led to the circuit controlling devices 70—71 under the influence of the film F or the projector mechanism, (not shown) and the conductor 50.

By this means, it will be seen that the circuit to be energized through the action of the film, will be manually selected, due to the closure of the switch members 48—49 or 48'—49' so that the desired electromagnet 23 will be energized at the proper time to throw into engagement the pawl or detent 21 for rotating with the selected sleeve 17, the selected record carrier 9.

The engagement of the pawl 21 with the teeth 12, will normally hold the inner end of the armature lever 22 toward the electromagnet even after the circuit is broken and the electromagnet deenergized, so that at the desired time, the manipulator may operate the crank 43, as before described, to cause the shaft 36 to throw into operation, the second record carrier 9. The shaft 41 is manipulated through the crank 43 so as to close the next switch 48'—49' and simultaneously operate the shaft 36 so that at the time the electromagnet 23 of the second record carrier is energized the pawl 21 is caused to engage its disk 8 to rotate the record carrier 9'.

What is claimed is:

1. The combination with a source of electrical energy, a film controlled switch, and two sound record carriers, of means for selecting the carriers to be set in motion including two rotating driven members, one to each carrier, an electromagnetically operated connecting means for each rotating driven member and its carrier, two switches, a circuit including the source of electrical energy, the film controlled switch, either one of the two switches and an electromagnet, manually controlled means for closing one of the two switches at a time, and means adjustable with the manually controlled switch closing means for releasing one of the connecting means previous to the closure of the switch of the electromagnet of the other connecting means.

2. In a selecting and operating mechanism for sound record carriers, the combination with a plurality of rotary record carriers, actuating members, one for each carrier, cooperating connecting means between each member and its carrier, means for connecting one of

the connecting means at a time, manually controlled means for selecting which of the connecting means is to be operated, and means adapted to be adjusted simultaneously with the latter means for releasing one connecting means as the other connecting means is selected.

3. The combination with a motion picture projector, a film, and a plurality of rotary sound record carriers, of means for controlling the successive operations of the sound record carriers, including a driving device common to all of the sound record carriers, means controlled by the film for connecting one of the carriers at a time, manually controlled means for selecting which one of the record carriers is to be operated, and means adapted to be adjusted simultaneously with the latter means for releasing one of the record carriers as the other is selected.

4. In a selecting and operating mechanism for sound record carriers, the combination with two rotary record carriers, actuating members, one for each carrier, coöperating connecting means between each member and its carrier, means for connecting one of the connecting means at a time, manually controlled means for selecting which of the connecting means is to be operated and means controlled simultaneously with the latter means for releasing one connecting means as the other connecting means is selected, said last means including a longitudinal slidable member adapted to be moved

alternately toward the respective connecting means of the two sound record carriers.

5. In a selecting and operating mechanism for sound record carriers, the combination with a plurality of rotary record carriers; actuating members, one for each carrier; co-operating connecting means between each member and its carrier including a toothed member, a toothed pawl for engaging the toothed member, an armature operably connected to the toothed pawl, an electro-magnet for actuating the armature to connect the toothed pawl, and a releasing member connected to the armature and projecting beyond the periphery of its respective record carrier; means for energizing the electro-magnet to operate the armature; manually controlled means for selecting which of the armatures is to be operated; and means adapted to be operated simultaneously with the latter means for disposing a projection in the path of the outer end of either one of the armature releasing members, whereby one releasing member is operated while the other armature is electro-magnetically operated.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHAS. W. EBELING.

Witnesses:

MAY MULLANE,
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

VARIABLE SPEED MECHANISM FOR SOUND AND
PICTURE REPRODUCING MECHANISM.

1,261,796 ----- C. W. Ebeling,
Filed Oct. 30, 1913, Renewed Jan. 19, 1918.
Patented Apr. 9, 1918.

VARIABLE SPEED MECHANISM FOR SOUND AND PICTURE REPRODUCING MECHANISM.

1,261,796.

Patented Apr. 9, 1918.

5 SHEETS—SHEET 1.

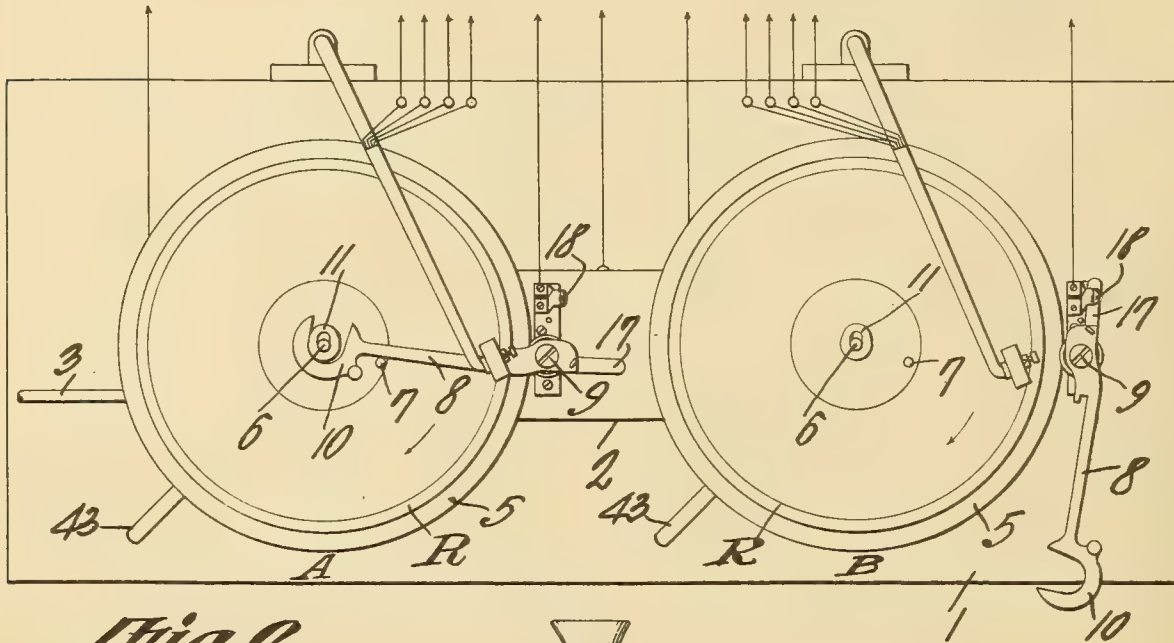


Fig. 2.

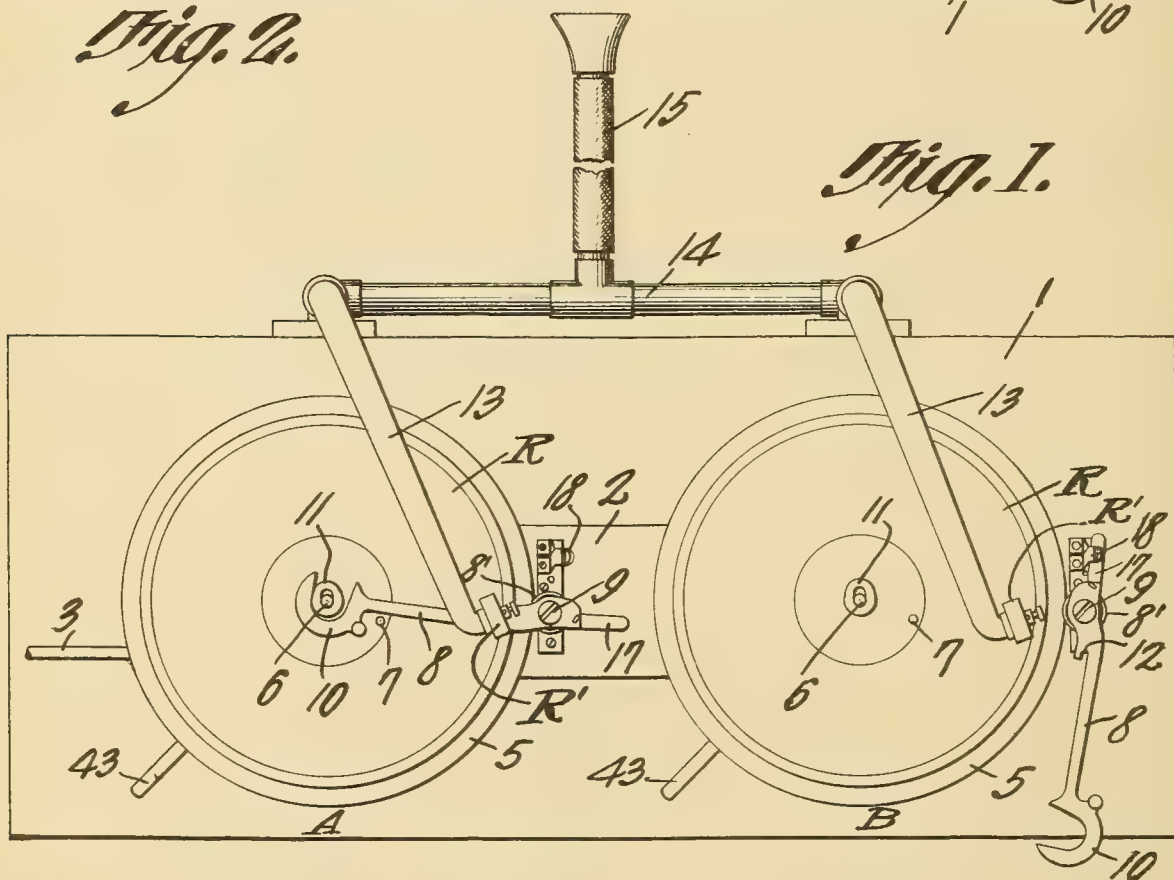


Fig. 1.

Witnesses

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5 SHEETS—SHEET 2.

Fig. 3.

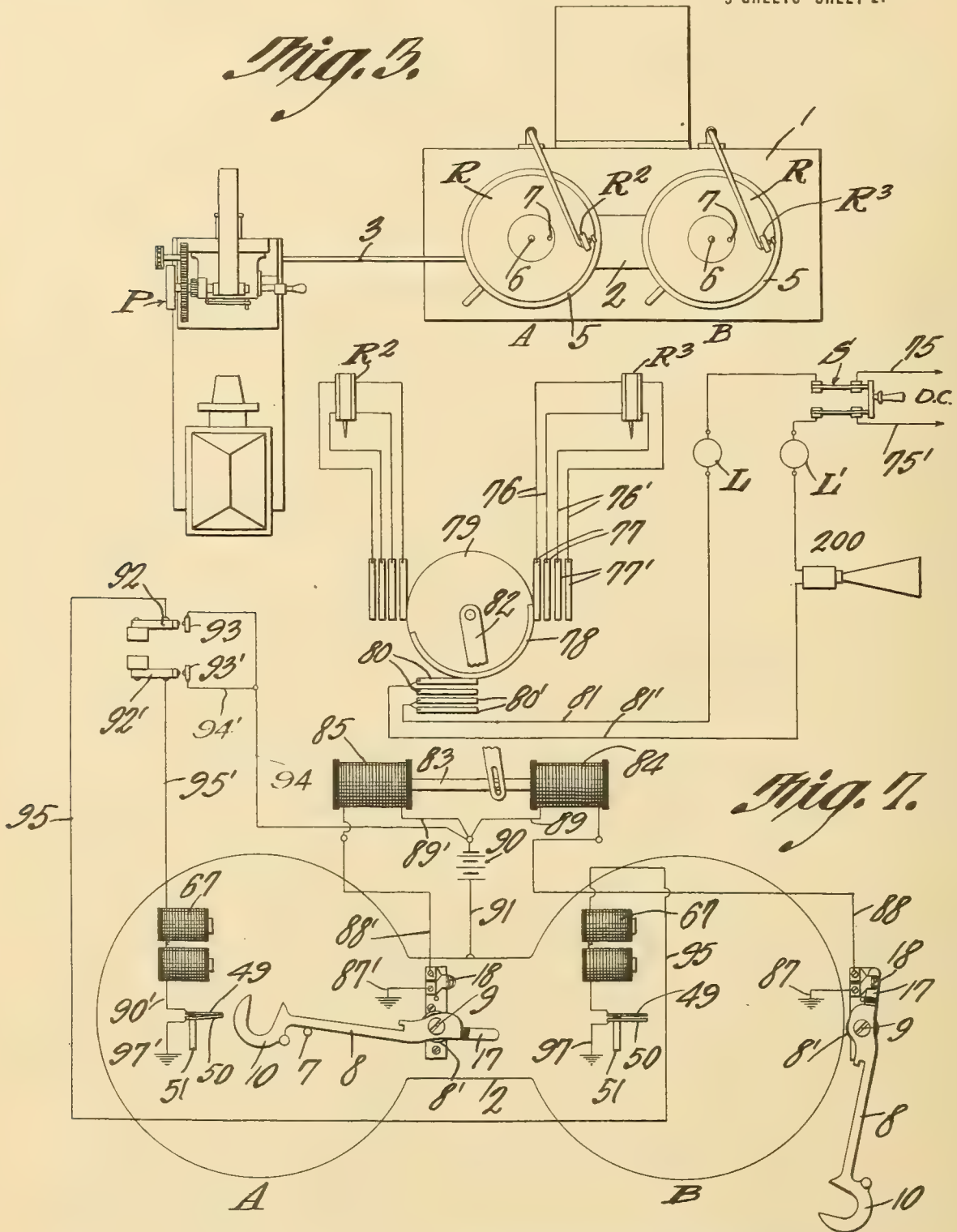


Fig. 7.

Witnesses

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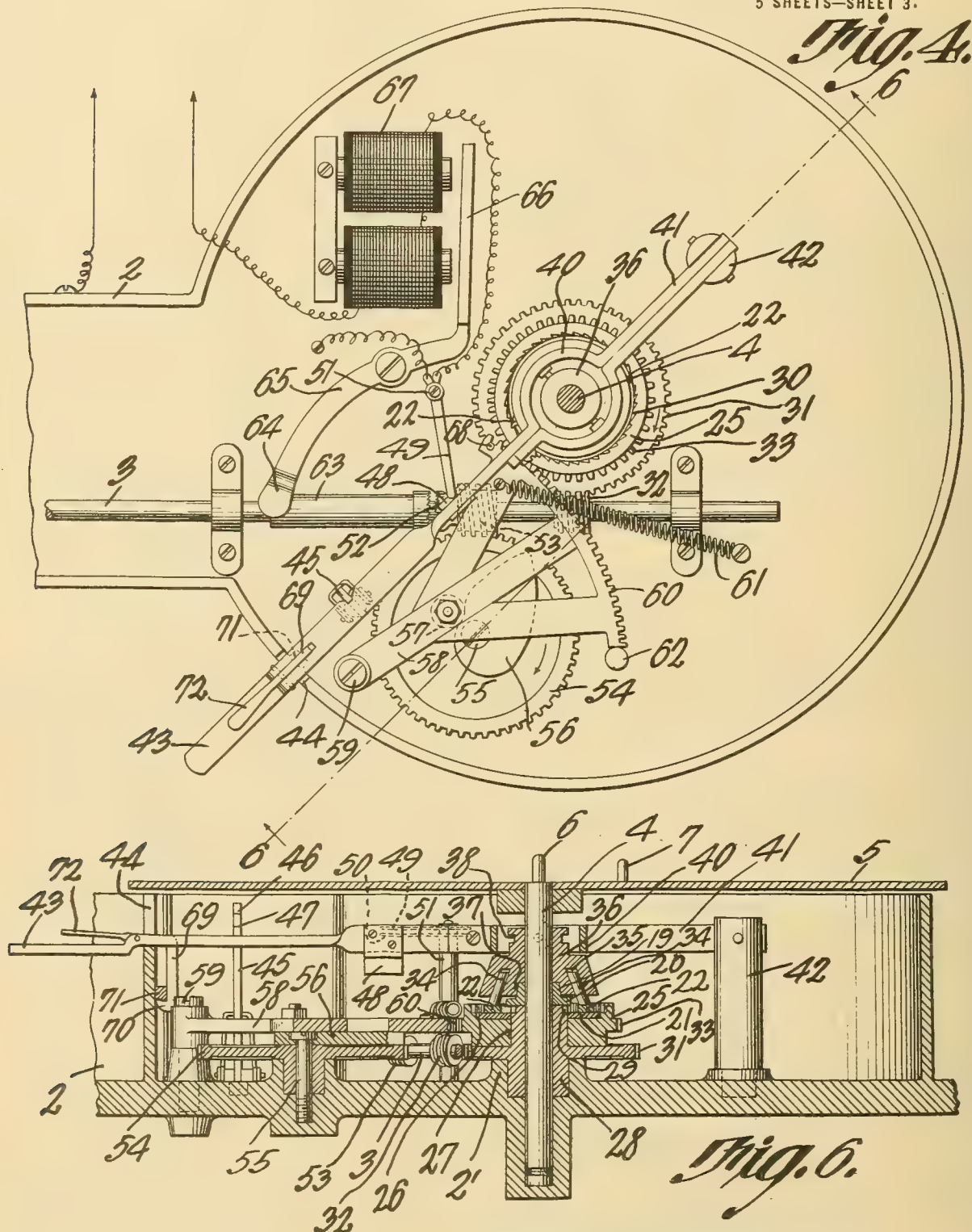
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5 SHEETS—SHEET 3.



Witnesses

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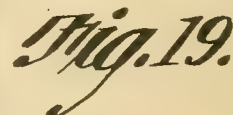
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Patented Apr. 9, 1918.

5 SHEETS—SHEET 4.



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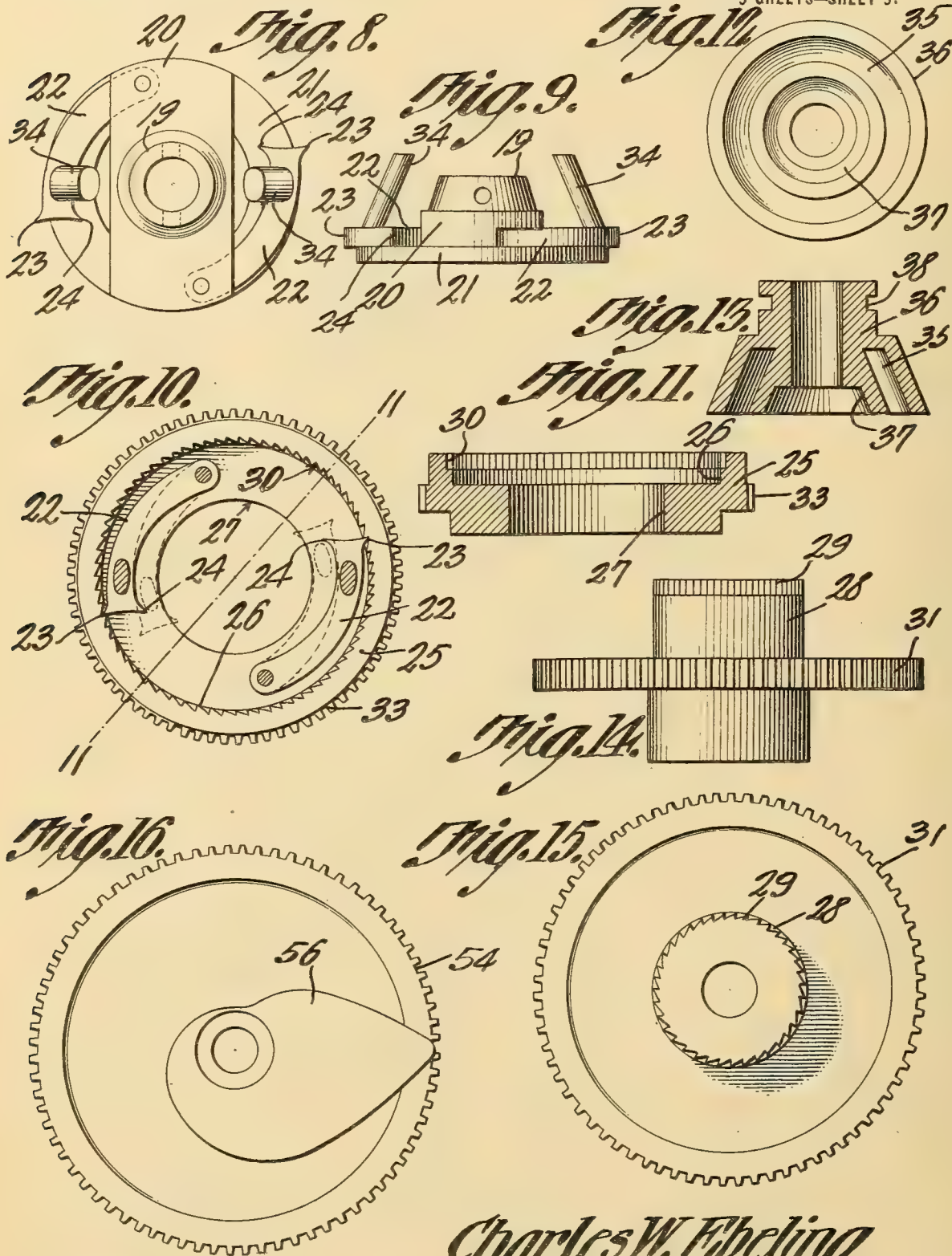
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1,261,796.

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5 SHEETS—SHEET 5.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES W. EBELING, OF NEW YORK, N. Y.

VARIABLE-SPEED MECHANISM FOR SOUND AND PICTURE REPRODUCING MECHANISM.

1,261,796.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed October 30, 1913, Serial No. 798,295. Renewed January 19, 1918. Serial No. 212,836.

To all whom it may concern:

Be it known that I, CHARLES W. EBELING, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new and useful Variable-Speed Mechanism for Sound and Picture Reproducing Mechanism, of which the following is a specification.

The present invention relates to improvements in motion picture and sound recording and reproducing machines, one object of the present invention being the provision of means whereby a record carrier when used for recording or reproducing is initially started at a slow speed, said speed being gradually increased until the maximum is reached, thus insuring the proper placing and guiding of the stylus in the phonic groove and rendering the present device especially adapted for use in connection with synchronous action both for sound recording and reproducing with a motion picture camera or projector mechanism; and the present structure is also designed for its use in recording sound records alone where it is desired to employ a succession of, or a plurality of records to reproduce speeches, songs or plays.

Heretofore in making sound records and reproducing the sounds recorded thereupon it has been impractical to bring records into play successively so that where necessary a word or syllable might be cut or severed in two, a portion being impressed upon the preceding and a portion at the beginning of the succeeding record. By reason of this fact, the size of the record has been limited, and the artist must be rehearsed previously to making the record so as to insure the impressing of the full act, song or speech upon a single tablet, cylinder or disk. With the present invention, one tablet is operated at a time and the succeeding tablet is thrown in, to produce the desired successive action and to have recorded thereon without any interruption between the two tablets, exactly as if taken upon a single table, it being possible as before stated to cut a syllable so that a portion thereof will be upon the preceding while the remaining portion will be upon the succeeding tablet. This feature cannot be too greatly emphasized as with this apparatus it is possible to reproduce a complete play, opera or speech without interruption to the artist or speaker, and where desired in absolute synchronism with the motion pic-

ture camera during the production of the negative of the photograph. In order to accomplish this result, it has been demonstrated that two record carriers are only necessary, for while one tablet is having sound recorded thereon, or the record is being reproduced, the next succeeding tablet to receive the record, or the record that is to be reproduced, may be manually placed upon the remaining record carrier, and the mechanism set for operation at the finish of the first tablet, the first record carrier being brought to a halt and during the continued operation of the second, the third tablet or record being positioned for operation, etc.

It is also possible with the present mechanism, to operate in conjunction with a motion picture projector, and a single film, a plurality of sound records, so that the same are automatically connected to and disconnected from the projector mechanism, and where it is necessary, there is provided an interval between the operation of one record carrier and the next to permit of the projection of titles, announcements and the like, upon the screen and through the instrumentality of the moving film. By this means, the film is permitted its desired movement at all times, it having been demonstrated in practice, that with a 12 inch reel of film, five ten inch record disks, or in other words, five subjects may be visually displayed with the sound accompaniments.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings—

Figure 1 is a top plan view of the present mechanism when used as a sound recorder for producing sound record tablets.

Fig. 2 is a similar view when the same mechanism is used for a sound reproducing machine.

Fig. 3 is a top plan view, in the nature of a diagram, showing the present reproducing mechanism connected to and operated from a motion picture projector.

Fig. 4 is a top plan view of a portion of the record carrier casing showing the driv-

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105

110

ing shaft, and a single mechanism for controlling one record carrier, the parts being in the position they assume just previous to the automatic starting and connecting of the mechanism to the driving shaft.

Fig. 5 is a view similar to Fig. 4 showing the parts in the position they assume when the gradual starting means has released the electromagnetically controlled clutch and has placed the selected clutch in position for direct connection to the driving shaft, or at the point where the record carrier is released from the gradually increased speed mechanism to receive its maximum speed.

Fig. 6 is a section taken on line 6—6 of Fig. 4.

Fig. 7 is an electrical diagram used in connection with the sound reproducing and motion picture projector as illustrated in Fig. 3.

Figs. 8 and 9 are enlarged detail views of the record carrier selective clutch member.

Fig. 10 is a top plan view of the slow and gradual speed controlling clutch member, showing the pawls in the position they assume at the initial starting of the sound record carrier, dotted lines illustrating the position thereof, when the sound record carrier is connected directly to the drive shaft.

Fig. 11 is a section taken on line 11—11 of Fig. 10, minus the record carrier clutch member.

Figs. 12 and 13 are detail views of the slidable pawl actuating member.

Figs. 14 and 15 are enlarged detail views of the direct drive clutch member.

Fig. 16 is a top plan view of the gear and cam for imparting the slow starting movement to the record carrier.

Fig. 17 is an enlarged detail view of the lock for the selecting sleeve actuating lever, dotted lines illustrating the various positions at which the lever is capable of being held.

Figs. 18 and 19 are enlarged detail views showing the method of controlling the electrical circuit that actuates the electromagnetically controlled clutch of each sound record carrier mechanism.

Referring to the drawings, the numeral 1 designates a base or support, which has mounted thereupon, the casing 2, the same being constructed to form a receptacle, in the present instance, for two record mechanisms A and B.

Two shafts 4 are therefore employed, each shaft 4 of which is adapted to be operated from the driven shaft 3, which when the device is used as a recorder as shown in Fig. 1, may be driven from any form of motor or from the camera mechanism of a motion picture projector (not shown), or as shown in Fig. 3, from the projector mechanism P of a motion picture machine. A record platform 5 is carried upon the upper end of the

shaft 4 of each device, the upper end 6 of the shaft 4 being reduced and constituting the centering pin for the record tablet R, a second pin 7 being carried by the platform 5 and entering the record so as to hold the same fixed against independent rotation as the platform 5 is rotated.

As clearly illustrated in Figs. 1 and 2, and in order to complete the present mechanism both for recording and reproducing sounds, a stylus guiding arm 8 is pivoted at 9 for swinging and slight longitudinal sliding movement, its hooked terminal 10 being disposed to embrace and be held by the centrally disposed cam 11 carried by the tablet R, so that in the position as shown in Fig. 1, the sound box R' may be placed so that the stylus thereof will seat within the stylus guiding kerf 12 of the member 8 to, at the proper time, be freed, as the arm 8 is moved to the right, at the beginning of the phonic groove of the tablet R due to the cam action upon the member 8, said member 8 being automatically released and thrown from the position as shown at the left in Fig. 1 to that shown at the right due to the engagement of the pin 7 at the opposite side of the member 8 as viewed at the left in Fig. 1. Thus the arm 8 is thrown out of the path of the rotating stylus and out of engagement with the cam 11. In the recording mechanism as shown in Fig. 1, the sound tubes 13 are connected to and carry their respective recorders R', a single conduit 14 with the sound directing conduit 15 being positioned as shown, it, however, merely being shown as indicative of any means whereby the sound may be conveyed and impressed upon the tablet R, the various mechanisms required for maintaining the record soft not being illustrated.

As shown, the pivoted member 8 is provided with the switch closing terminal 17, which coöperates with the spaced spring terminals 18 to close a circuit, the installation and purpose of which will presently appear.

As the mechanism for actuating each platform 5, is identical, the description of one will suffice for both.

Fixed upon the shaft 4 within the casing 2 and below the platform 5 is a sleeve 19, having the bridging portion 20 which carries the ring 21. Pivoted to the bridging portion 20 at diametrically opposite points, are the two pawls or arms 22, the free ends of which are provided with the two teeth 23 and 24, whereby when the pawls move outwardly, the teeth 23 form the connecting link between the shaft carried clutch member 21 and the slow gradual speed clutch member 25, while the teeth 24 when the pawls are moved inwardly, as will presently appear, constitute a means for directly connecting the platform 5 to the driving shaft.

The member 25, as clearly illustrated in

Figs. 6, 10 and 11, is counter-bored as at 26 to form a receptacle for the annular member 21 of the shaft carried clutch member and permit the same to freely rotate thereupon when the arms 22 are in neutral position. The central bore 27 of the member 25 fits rotatably upon the upper portion of the sleeve 28 whose ratchet teeth 29 are disposed to be in the same plane as the ratchet teeth 30 of the member 25, or in a plane to receive the teeth 24 of the arms 22 when the same are moved inwardly to the dotted line position, as shown in Fig. 10, the ratchet teeth 30 being engaged as clearly shown in full lines in said figure, when the arms 22 are moved outwardly. The sleeve 28 is provided with the large pinion 31, which is rotated at all times by the drive shaft 3 through the worm gear 32 keyed upon said shaft 3. Thus, the sleeve 28 constitutes the member that is driven at all times and rotates freely upon the lower end of the shaft 4 within the support 2' of the casing.

The member 25 is provided with the peripheral gear teeth 33 which are the active transmission means, as will presently appear, when the pawls or arms 22 are in the full line position as shown in Fig. 10.

In order to manually and automatically actuate the arms 22, to place them in operative engagement so that the platform 5 is rotated at a gradually increasing speed or at the maximum speed, or to place the arms 22 in a neutral position, the two inclined arms 34 are provided, one to each arm 22, these arms being disposed to project within the annular recess 35 of the controlling member 36. This member 36 is slidably mounted upon the shaft 4 for movement to and from the member 21, the same being counter-bored at 37 to receive the truncated end of the sleeve 19 when the clutch members are in their lowermost position and the teeth 24 are in engagement with the ratchet teeth 29. A circumferential groove 38 is provided in the upper end of the member 36, carried in the frame 40 of the control lever 41. This lever is pivoted at its inner end in the post 42 and has its handle 43 projected through the slot 44 of the casing and in ready access to the operator.

In starting the present mechanism, the lever 41 is elevated so that the same will rest in the upper recess 46 of the spring actuated trigger lock 45, as clearly shown in Fig. 17. The lever 41 at this time is in the position, dotted line *a* of Fig. 17, at which time the member 36 is elevated with the pins 34 disposed in the lower end of the annular recess 35 with the arms 22 extended in the position as shown in Figs. 8 and 10. Thus the ratchet teeth 30 are connected so that as soon as the member 25 is rotated, the record carrier platform 5 will be rotated. When the lever 41 is in the dotted line position *b*, resting in the re-

cess 47 of the trigger latch 45, the member 36 is in central or neutral position and the arms 22 are disengaged both from the ratchet teeth 29 and 30. When the lever 41 assumes the lowermost position as shown in full lines Fig. 17 and as clearly illustrated in Fig. 6, the arms 34 are seated well within the recess 35 of the member 36 and consequently the arms 22 are moved to dotted line position as shown in Fig. 10 with the teeth 24 in engagement with the ratchet teeth 29 of the member 28, and as the member 28 is driven directly from the shaft 3 through the worm 32 and gear 31, the record carrier platform 5 is thus rotated at the maximum speed.

Carried by the lever 41 between the shaft 4 and the free end thereof, is a lip or projection 48, the purpose of which as clearly shown in Figs. 18 and 19, is to permit of the closing and opening of the switch members 49 and 50, the purpose of which will presently appear in the detailed description of the electrical installation. The switch 49—50, as clearly shown in Fig. 19, however, will be closed when the lever 41 is in the elevated position or the position *a* of Fig. 17, being opened when the same is released by the member 58, as will presently appear to permit the lever 41 to assume the full line position Fig. 17 and also as clearly illustrated in Fig. 18. The switch members 49 and 50 are insulated from each other and are connected to and supported by the post 51 within the casing.

Mounted freely upon the shaft 3 is a clutch member 52, which is provided with the worm gear 53, said worm gear 53 being in mesh at all times with the gear 54 which is mounted at 55 in the casing for rotation, said gear carrying the cam 56, which is adapted to engage the anti-frictional roller pin 57 carried by the member 58. This member 58 is pivoted for swinging movement at 59, so that its toothed segment 60, which is in mesh at all times with the gear teeth 33 of the member 25 will be moved from the position as shown in Fig. 4 to that shown in Fig. 5 and consequently impart rotation to the member 25 and through the pawls or arms 22, which are at that time in the full line position as shown in Fig. 10, thus imparting rotation through the clutch member 21 to the shaft 4 and platform 5. The cam 56 is so constructed, that the first movement imparted thereto will gradually move the segment 60 so that a slow speed will be imparted through the members 25 and 21 to the shaft 4, said speed gradually increasing, as the segment 60 approaches its extreme position, as shown in Fig. 5 and previous to its release by the cam 56 to be returned by the spring 61. The segment 60 is limited in its return movement by means of the pin 62 mounted in the casing.

When the segment 60 was primarily start-

ed by the cam 56, the platform 5, as just described was gradually started from a standstill and rotated through the medium of the segment 60. As the trigger latch 45 is in the path of the member 58, such member 58 simultaneously with the engagement of the pin 68 with the clutch member throwing arm 65, engaged the trigger latch 45 so that the lever 41 was released from its upper position *a* to its lower position, thus permitting the clutch actuating member 36 to descend and retract the pawls 22 so as to disengage the teeth 23 from the ratchet 30 of the member 25 and engage the teeth 24 with the teeth 29 of the high or maximum speed actuating clutch member 28.

In order that the gear 54 may be automatically operated or connected to the shaft 3 through the clutch 52, a slidably mounted clutch member 63 is splined upon the shaft 3 and is controlled by means of the yoke 64 carried by the lever 65, said lever 65 being provided with the armature 66 disposed to be influenced in a direction to engage the clutch 63 with the clutch 52 when the electromagnet 67 is energized, the circuit to said electromagnet 67 being completed upon the positioning of the lever 41 in the notch 46 when the switch members 49 and 50 are closed as illustrated in Fig. 19.

As before described when the pin 68 assumes the position as shown in Fig. 5, the clutch throwing lever 65 is operated and the clutch member 63 is released from the member 52 so that the shaft 3 will rotate freely within the member 52 without transmitting motion to the gear 54 and cam 56.

In order to lock the lever 41 in its lowermost position with the clutch members 28 and 21 driving the shaft 4 and platform 5, and thus during the recording or reproducing of the record, a bell crank lever 69 is pivoted in the free end of the lever 41 and has its hooked terminal 70 disposed to engage the lug 71 of the casing 2, said hooked terminal 70 being manually released by means of the handle 72.

It is thus evident from the foregoing, that the operator in starting the present mechanism, manually elevates the lever 41 to be automatically engaged by the catch 45 and maintained in the uppermost position, such action closing the switch members 49 and 50 and thus permitting the actuation at the proper time of the electromagnet 67 and its armature controlled lever 65 to throw the clutch member 63. Thus, as will presently appear, the energization of the electromagnet 67, the shaft 3 being continually rotated, will cause the clutch member 63 to engage the clutch member 52 and through the gear 54 and cam 56 the segment 60 will be swung so that the same will impart a slow gradually increasing movement through the clutch members 21 and 25 to the shaft

4 and record platform 5. The cam 56, due to its peculiar shape, will cause a gradually increasing speed to be imparted to the segment 60, thus bringing the platform 5 from an inert condition to the desired speed at the time when the pin 68 engages the clutch actuating lever 65 and the member 58 engages the spring actuated latch 45 to permit the lever 41 to fall to its lowermost position. Thus simultaneously with the disconnection of the clutch 63 from its cooperating member 52, the movement of the arms 22 from the full to dotted line position in Fig. 10 there will be a direct connection of the clutch member 28 through its gear 31 and the worm 32 of the shaft 3 to the record carrier platform 5.

In practice, the distance of rotation imparted by the segment 60 is approximately two-thirds to a full revolution of the shaft 4 and record carrier 5, so that the stylus guided by the stylus guiding portion 12 of the member 8 will, due to the rotation of the record tablet R and its cam 11 impart the desired movement to the stylus so as to deliver the stylus into the beginning of the phonic groove. As the record carrier is moved at a gradually increasing speed, there is no danger of the stylus being pulled or jumped into any other point of the phonic groove, this peculiar arrangement providing a means to insure the proper introduction of the stylus into the groove and at the beginning of the sound reproducing portion thereof simultaneously with the release of the clutch member 63, and the connection of the clutch member 21 with the clutch member 28, said member 28 as before described being continuously rotated through the shaft 3 and the worm gear 32.

As before stated when the lever 41 was released from its upper dotted position *a* to the lower full line position Fig. 17, the lug 48 was also lowered and thus permitted the opening of the switch members 49 and 50 and the consequent opening of the circuit to the electromagnet 67 so that no accidental energization of such electromagnet could take place until the lever 41 was again manually elevated to its uppermost position.

After the playing or completing of the record, the operator grips the lever by the handle 43 and releases the catch 69 so that the lever may be positioned in the intermediate dotted line position *b* Fig. 17, the clutch member 21 due to the intermediate position of the actuating member 36 having its arms 22 neutral, while the record just recorded or reproduced may be removed from its platform 5 and the next tablet placed thereupon. After the proper positioning of the record and the arm 8, the lever 41 is then elevated manually to its uppermost position to be held thereat by means of the notch 46 of the catch 45 so that

the lug 48 closes the switch members 49 and 50.

When the cam 56 as before described, has moved to a slightly farther distance than that shown in Fig. 5, or when the apex thereof has passed the pin 57, the segment 60 is released to the action of its spring 61 so that the parts are then returned to their normal position, as clearly shown in Fig. 4. As the member 25 at that time, is released, the same is freely rotated in the reverse direction by the segment 60 when returning from its extreme position.

In order to fully describe the operation of reproducing with the present mechanism and the installation as shown in Figs. 3 and 7, and wherein the transmitters R^2 and R^3 are electrical transmitters for operation from the records carried by the respective mechanisms A and B, it is preferable that the current be taken from the direct current lines 75 and 75' and led to the present sound reproducing mechanism by means of the switch S. In this form of transmitter, conductors 76 and 76' are led to the metal contact members 77 and 77', which are disposed to engage a plurality of metal contact strips 78, there being one to each strip 77—77' carried by the oscillatory insulating member 79. Thus as illustrated in Fig. 3, the member 79 with its metal plate 78 constitutes a rotary switch for selecting either one of the respective transmitters R^2 or R^3 , as will presently appear. Adapted to contact the respective metal strips 78 at all times are the metal strips 80 and 80', these being disposed to be in the same place so that the respective contact plates 77—77' will be properly electrically connected to the conductors 81—81' so that current is properly delivered from the mains 75 and 75' through the resistance lamps L—L' and the transmitters R^2 or R^3 so that the sound reproduced by the phonic groove upon the record being actuated and the respective transmitter, will be amplified and directed to the desired point by means of the amplifier or receiver 200.

It is essential that the member 79 be properly controlled so as to insure of the proper transmitter being active and yet at the same time it is undesirable to complete the electrical circuit with the transmitter and its amplifier 200 previous to the placing of the stylus into the sound reproducing portion of the record. To this end, the switch members 17 and 18 of the respective mechanisms A and B are provided.

Thus with the parts in the position as shown in Fig. 7, the arm 8 is in the position to receive the stylus of the transmitter in the directing kerf 12, the lever 41 being elevated so that the switch members 49 and 50 are closed, and the record being in the position to now be started or rotated. As before

stated, the rotation of the record due to the cam 11 will pull the arm or member 8 inwardly and direct the stylus of the transmitter into the phonic groove so that when the pin 7 has moved from the position at the rear of the arm 8 and engages the same upon the opposite side, the arm 8 will be thrown from the position as shown at machine A in Fig. 7 to that shown in the machine at B. The arm 8 being assisted in this movement by means of the spring 8' will place the switch closing member 17, which is insulated from the arm 8 to close the switch 18, and assuming that the record in the machine B is rotating, the following circuit to energize the electromagnet 84 is formed: The ground 87 which is connected to the casing 2, the switch members 17 and 18, the conductor 88, the electromagnet 84, the conductor 89, the battery 90, and the conductor 91 which is grounded on the casing 2. Thus the electromagnet will operate the core 83 to move the lever 82 to the position as shown in Fig. 7, and thus rotate the switch 79, so that the contact plates 77—77' of the transmitter R^3 will engage the plates 78, and through the plates 80 and 80' connect the transmitter R^3 in circuit with the current mains 75 and 75'. Thus, the telephonic circuit is closed and as the record of the machine or mechanism B is being rotated, the sound produced in the transmitter R^3 will be repeated in the amplifier or receiver 200. This receiver 200 is disposed in practice at any desired point within the theater or building, and any number may be placed in circuit as may be deemed necessary.

The switch members 17 and 18 of the mechanism A are disposed to energize the electromagnet 85 through a circuit including the battery 90, the conductor 91, the casing 2, the conductor 87', the switch members 17 and 18, the conductor 88', the electromagnet 85, and the conductor 89'. Thus when the mechanism A is in the position as shown in Fig. 2, the switch 79 will be moved in the opposite direction so that the transmitter R^2 will be connected in the telephonic circuit.

In order to insure the automatic energization of the electromagnet 67, the two film actuated switch members 92 and 92' are provided. The switch members 49 and 50 are closed when the lever 41 is elevated as previously described, and consequently automatically connects the elected or selected record carrier, through the instrumentality of a moving film (not shown) of the motion picture projector mechanism P. A button or other means upon the film (not shown) which will cause the movement of its respective switch member 92 or 92' into closing relation with the switch points 93—93' is carried by the film and at the desired predetermined points will permit of the proper connecting of the selected record

with the shaft 3 and consequently the projector mechanism.

When the switch as 92—93 was closed by the film as just described, the circuit completed included the battery 90, the conductor 91, the casing 2, the conductor 97, the switch members 50 and 49, the electromagnet 67 and the conductor 95. Thus the electromagnet 67 at the elected or selected reproducing mechanism here illustrated in Fig. 7 as the mechanism B, is energized, and consequently actuates the clutch throwing lever 65 to throw the clutch member 63 and consequently operate through the gear 54 and the cam 58 of the segment 60, to thus gradually start the record of the mechanism B from its inert condition to gradually increased speed until finally the record carrier is connected through the clutch members 21 and 28 to the shaft 3. The opening of the circuit controlling the electromagnet 67 to prevent any danger of the reenergization of the electromagnet 67 was caused by the falling of the lever 41 when the catch 45 was released by the member 58. The switch members 49 and 50 of the mechanism A were manually set by the elevation of the lever 41 and the closed switch 17—18 is opened manually by the operator when the record on the mechanism B has reached its end, and just previous to the closing of the switch 92'—93' by the selected button carried by the film and thus consequently previous to the energization of the electromagnet 67 of the mechanism A through the circuit including the battery 90, the conductor 91, the casing 2, the conductor 97', the switch members 50 and 49, the conductor 90', the electromagnet 67, the conductor 95', the switch 92'—93' and the conductors 94' and 94.

It will thus be seen from the foregoing, that with the present installation, both mechanical and electrical, that the complete mechanism both for recording sound either independently of or in synchronism with a motion picture camera, is permissible, while the complete control of the present apparatus for reproducing sound from a projector mechanism as per the mechanisms A and B is provided for.

It is also apparent that by the manipulation of the records from one carrier to the other, that complete plays, operas or the like may be operated in synchronism with the film or if so desired such mechanisms may be operated independently of the film to reproduce an operatic or musical selection without the reproduction of the scene.

What is claimed is:

1. In a machine of this character, a drive shaft, a driven member, means for connecting the driven member to the shaft, whereby the driven member is started and the speed gradually increased to the maximum, said

latter means including a three-membered clutch, two of the members of which when connected operate the driven member from the drive shaft at a gradually increasing speed while the third member when connected to the driven member operates the same at the maximum speed.

2. In a machine of this character, a drive shaft, a plurality of rotatable driven members, and a plurality of means, one to each driven member for connecting its respective driven member to the shaft, whereby the driven member is started and the speed gradually increased to the maximum, said latter means including a three-membered clutch, two of the members of which when connected operate the driven member from the drive shaft at a gradually increasing speed while the third member when connected to the driven member operates the driven member at the maximum speed.

3. In a machine of this character, a driving element, a rotatable driven member, a freely rotatable driven clutch member for the driven member operably connected to the driving element, a second freely rotatable driven clutch member for the driven member, means for connecting the driving element to the second clutch member, a clutch member operating with either of the above clutch members one at a time, and means for controlling the latter clutch member, whereby the driven member is rotated initially at a gradually increasing speed by the second clutch member and at full speed by the connection of the first clutch member.

4. In a machine of this character, a driving element, a plurality of driven members, a freely rotatable driven clutch member for each driven member operably connected to the driving element, a second freely rotatable driven clutch member for each driven member, means for connecting the driving element to each second clutch member, a clutch member for each driven member for operation with either one at a time of the freely rotatable driven clutch members, and means for controlling the latter clutch members, whereby each driven member is rotated initially at a gradually increasing speed by the second clutch member and at a maximum speed by the first clutch member.

5. In a machine of this character, a drive shaft, a driven member, and means for connecting the driven member to the shaft, whereby the driven member is started and the speed gradually increased to the maximum, said means including a three membered clutch, two of the members of which when connected together cause the driven member to be operated by the drive shaft at a gradually increasing speed while the third member and one of said first two clutch members when connected to the driven member operate the same at the maximum speed.

6. In a machine of this character, a drive shaft, a plurality of rotatable driven members, and a plurality of means, one to each driven member, for connecting its respective
5 driven member to the shaft, whereby the driven member is started and the speed gradually increased to the maximum, each said means including a three membered clutch, two of the members of which when
10 connected together cause the driven member to be operated by the drive shaft at a gradually increasing speed while the third clutch member and one of said first two clutch members when connected to the driven mem-
15 ber operate the same at the maximum speed.

7. In a machine of this character, a driving element, a plurality of driven members, a freely rotatable driven clutch member for each driven member operably connected to
20 the driving element, a second freely rotatable driven clutch member for each driven member, means for connecting the driving element to each second clutch member, a clutch member for each driven member for
25 operation with either one at a time of the freely rotatable driven clutch members, and means for rotating the latter clutch members, whereby each driven member is rotated initially at a gradually increasing
30 speed by the second clutch member and at a maximum speed by the first clutch member.

8. In a machine of this character, a drive shaft, a driven shaft at right angles there-
35 to, a large and a small gear adapted to be

secured to the driven shaft, the small gear having internal ratchet teeth and the large gear having external ratchet teeth and said teeth being arranged concentric to each other, a double pointed pawl for engaging one set
40 of ratchet teeth at a time, an actuating member for the pawl slidably mounted upon the driven shaft, a swinging segment operably connected to the pawl actuating member, a rotatory cam operably connected to the drive
45 shaft, means carried by the segment for engaging the cam, whereby when the cam is operated the segment rotates the pawl during the engagement of the pawl with the internal ratchet teeth, means for operating
50 the pawl actuating member, and means operated by the segment for operating the latter means.

9. In a machine of this character, a driving member, a driven member, and a mechanism embodying a clutch device and having
55 means to connect the two members to effect a gradually increasing speed from the driving to the driven member, and means controlled by the latter means for positively
60 connecting the driven to the driving member after the driven member has attained maximum speed.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature
65 in the presence of two witnesses.

CHARLES W. EBELING.

Witnesses:

SELINA WILLSON,
NELLIE HERNDON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

ATTACHMENT FOR PHONOGRAPHS.

1,261,904 ----- E. W. Carlos,
Filed Jan. 8, 1917,
Patented Apr. 9, 1918.

E. W. CARLOS.
ATTACHMENT FOR PHONOGRAPHS.
APPLICATION FILED JAN. 8, 1917.

1,261,904.

Patented Apr. 9, 1918.

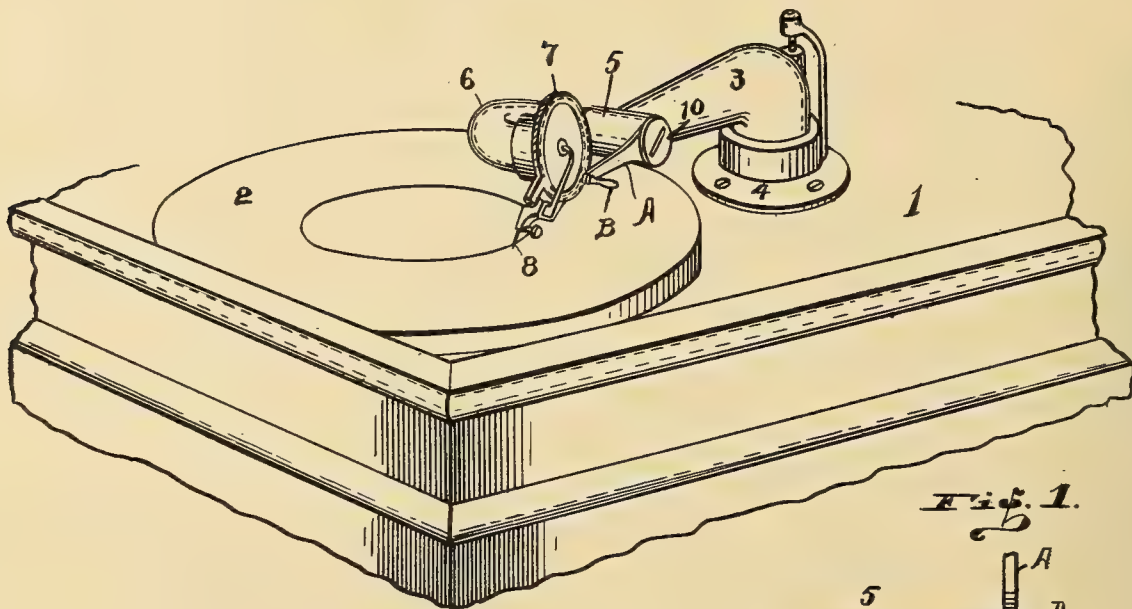


Fig. 1.

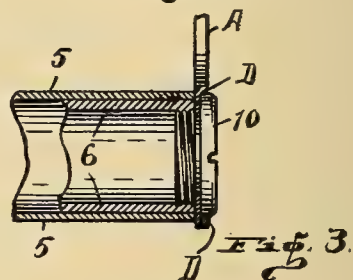


Fig. 3.

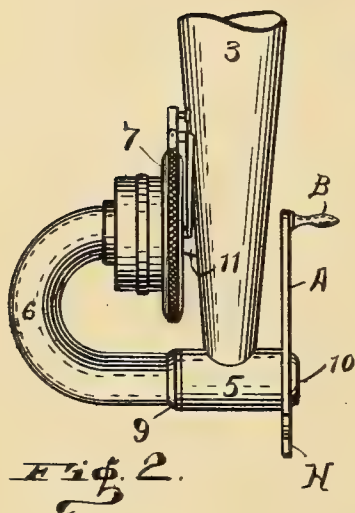


Fig. 2.

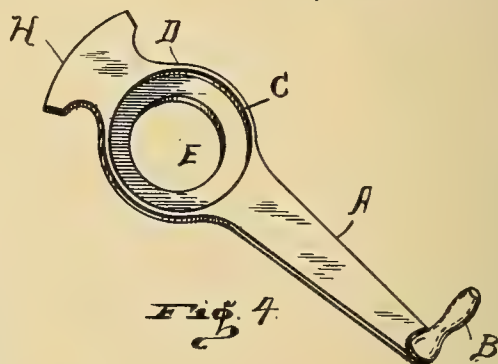


Fig. 4.

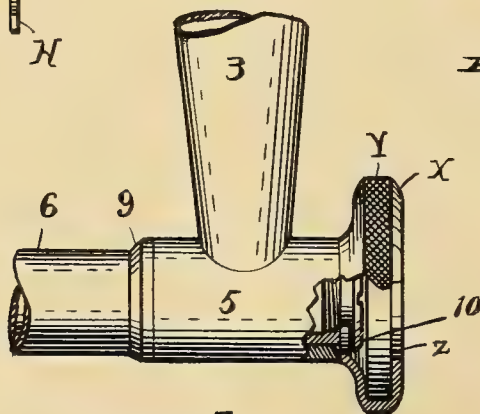


Fig. 5.

Witness;
Adelaide Korman;

Inventor,
Earl W. Carlos;
By Robert W. Tangle,
Attorney.

UNITED STATES PATENT OFFICE.

EARL W. CARLOS, OF RICHMOND, INDIANA.

ATTACHMENT FOR PHONOGRAPHS.

1,261,904.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed January 8, 1917. Serial No. 141,094.

To all whom it may concern:

Be it known that I, EARL W. CARLOS, a citizen of the United States, residing in the city of Richmond, in the county of Wayne and State of Indiana, have invented a new and useful Attachment for Phonographs, of which the following is a full, clear, and comprehensive specification and exposition, the same being such as will enable others to make and use the same with exactitude.

The object of my present invention, briefly stated, is to provide an attachment for phonographs or the like whereby the stylus or reproducer point or needle may be operated to lift it from the record, or to place it gradually in operative position in connection therewith without contact of one's hand with the machine proper and to place such means in the most handy and available position for the accommodation of the operator.

In the management of disk phonographs it is necessary to raise and lower the reproducer and the reproducer-point or needle by simply grasping the goose-neck and turning it up and down, but my invention contemplates means connected to said parts whereby the goose-neck may be turned as above stated but without direct contact of one's hand therewith, thereby dispensing with soiling the polished metal parts, preventing the hand of the operator from being in the way and from causing a shadow upon the needle or reproducer-point when one is making adjustments, to permit the required movements to be made more naturally, and to make the operations more easy for the operator.

Various other objects and advantages of the invention will be suggested in the course of the following description, and that which is new will be correlated in the appended claims.

The preferred means for carrying out my invention in a practical manner is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of the upper portion of the mechanism of a phonograph or talking machine, showing my invention in operative position in connection

therewith. Fig. 2 is a plan view of the reproducing mechanism, of the goose-neck, a portion of the taper tone-arm, and showing an edge view of my attachment. Fig. 3 is a central longitudinal section of a portion of the tone-arm box, or cylinder, and the inner end portion of the longer portion of the goose-neck, and showing the method of attaching my device in operative position. Fig. 4 is a perspective view of my attachment alone. And Fig. 5 shows a plan view of a modified form of my attachment in operative position.

Similar indices denote like parts throughout the several views.

In order that the construction, the operation, and the advantages of my invention may be better understood and appreciated, I will now take up a detailed description thereof in which I will set forth the invention as fully and as comprehensively as I may.

In the drawings numeral 1 denotes the upper portion or top of the body or case of a phonograph or talking machine. Numeral 2 denotes the record which rests upon the usual turn-table and which is adapted to revolve horizontally in the usual manner. Numeral 3 denotes the taper tone-arm, whose larger, downturned, end extends through the top 1, and it is rotatably mounted in the bearing 4, the latter being secured to the top 1. The smaller or forward end of the tone-arm 3 terminates in and is integrally and interiorly united with the tone-arm box or cylinder 5, which latter is disposed at right-angles to the tone-arm, and it is located horizontally and parallel with relation to the record 2.

Numeral 6 denotes the goose-neck, which is bent U-shaped, the same having a long and a short end projection.

To the short end of the goose-neck 6 is attached the reproducer 7, which carries the needle point or stylus 8, which is adapted to engage the record 2, the operation of which is not material to an understanding of this invention.

The longer end portion of the goose-neck 6 fits snugly but revolubly the interior of

the tone arm box 5, the end thereof being located even with the outer end of the box 5. A collar 9 is integrally connected around on the goose neck, immediately adjoining the inner end of the box 5, in order to prevent the extreme outer end of the goose-neck from moving endwise beyond the outer end of the box 5, and to provide an end bearing therefor.

Numeral 10 denotes a comparatively large flat-headed screw. The end portion of the longer end of the goose-neck is interiorly threaded to receive the exteriorly threaded stem of the screw, with the inner face of the head of the screw adapted to contact with the end of the box 5, thereby retaining the longer end of the goose-neck in rotative position in the box 5.

All of the said parts are of common construction, and I make no claim thereto, but they are simply explained in order to make clear the application of my invention thereto.

In the arrangement above mentioned the goose-neck, or the reproducer, is grasped by the operator and turned back, as in Fig. 2 until the reproducer rests upon the bracket 11, which latter extends from the under side of the tone arm, thereby placing the reproducer out of commission, that is placing the stylus out of contact with the record. Desiring then to place the stylus in contact with the record one must grasp the curved portion of the goose-neck, or the reproducer, and then turn the goose-neck in the box 5, thereby bringing the reproducer over forward to the position in which it is shown in Fig. 1, thereby engaging the stylus with the record.

As will be seen, my invention contemplates operating or turning the reproducer forward and backward without the necessity of the operator touching the goose-neck or the reproducer.

My preferred arrangement comprises a crank, which includes the lever A, having on its outer end portion a handle B, which is at right angles to the lever. The inner portion of the lever develops into a thin washer-like disk C, around the outer edge of which is an outwardly turned flange D, which flange projects in the same direction as the handle B, that is parallel with the box 5. In the center of the disk C is the aperture E, which is adapted to receive the stem of the screw 10 but without threaded engagement therewith, and the head of the screw 10 is adapted to snugly fit within the flange D.

In order to attach my device one has only to remove the screw 10, then insert the stem of the screw through the aperture E, with the head of the screw adapted to enter within the flange D. The screw 10 is then replaced in its former position in the end of

the goose-neck, and after being properly tightened the device will again be in operative condition.

Before fully tightening the screw 10 the lever should be turned to position parallel with the goose-neck, that is with the handle B approximately in alinement with the shorter end of the goose-neck, as indicated in Figs. 1 and 2.

It will now be seen that the goose-neck and the reproducer may be turned forward and backward by simply grasping the handle B and then turning the lever A as desired, thereby accomplishing the desideratum of this invention.

In some instances I add a counterbalance weight H, which is integral with the lever A, but it projects directly opposite to said lever, and it is adapted to counterbalance the lever and the handle, the said counterweight being shown in Figs. 2 and 4.

In some instances it may be desirable to dispense with the lever A and the handle B, and in lieu thereof to form a knob X, which flares out from the flange D around the screw 10 and concentric therewith, and the said knob should be provided with a knurled periphery Y, and an opening Z in the center of the outer end thereof, through which opening may be operated the screw 10.

I desire that it be understood that various changes and modifications may be made in the several details of construction, in order to adapt the invention to various conditions, without departing from the spirit of my invention and without sacrificing any of the advantages thereof.

Having now fully shown and described my invention, and the best means for its construction and adaptation to me known at this time, what I claim and desire to secure by Letters Patent of the United States, is—

1. In combination with a phonograph, a crank for turning the reproducer, said crank comprising a lever portion having on its outer end portion a handle which extends outwardly at right angles to the lever, the inner portion of the lever developing into a thin washer-like disk, an outwardly extending flange projecting from around the edge of said disk and concentric with a central aperture formed through the disk, said aperture being adapted to receive the stem of a screw therethrough but without threaded engagement therewith, the head of said screw being adapted to snugly fit within said flange, all substantially as shown and described.

2. In combination with a phonograph provided with a reproducer, a crank for turning the reproducer, said crank comprising a lever, a handle projecting out at right angles to and from the outer end of the lever, a disk integral with the inner

end of the lever there being a central aperture through said disk, and a flange extending out from around the edge of the disk, and a counterweight formed integral
5 with said disk and projecting directly opposite to said lever, all substantially as shown and described.

In testimony whereof I have hereunto subscribed my name to this specification in the presence of two subscribing witnesses. 10
EARL W. CARLOS.

Witnesses:

R. E. RANDLE,
ROBT. W. RANDLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE MOTOR

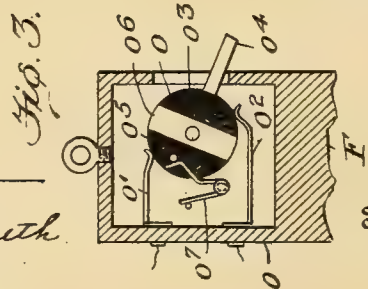
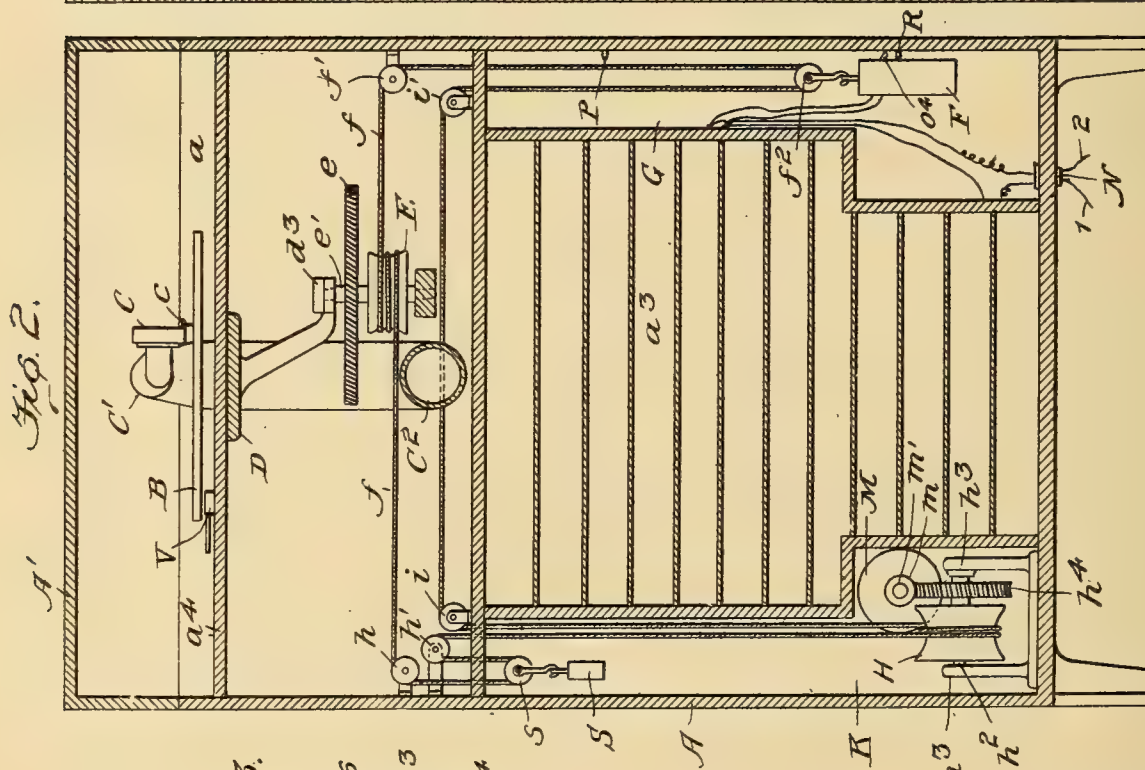
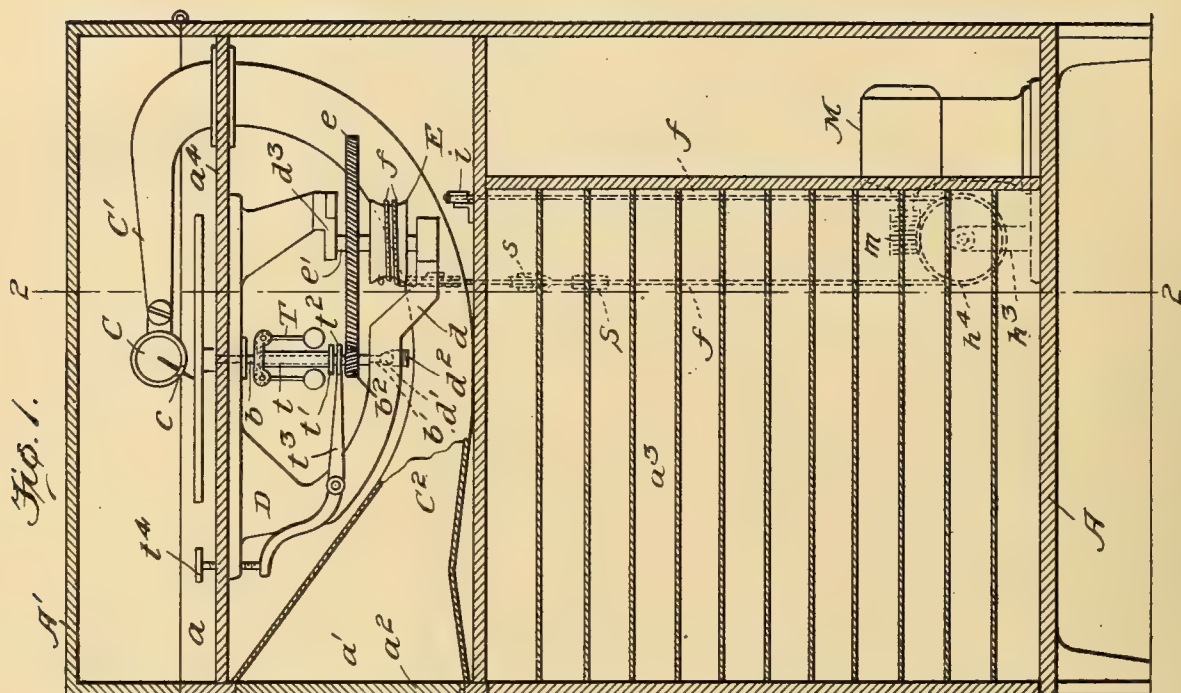
1,261,969 ----- E.E. Taliaferro,
Filed Feb. 18, 1915, Renewed Aug. 13, 1917
Patented Apr. 9, 1918.

E. E. TALIAFERRO.
TALKING MACHINE MOTOR.

APPLICATION FILED FEB. 18, 1915. RENEWED AUG. 13, 1917.

1,261,969.

Patented Apr. 9, 1918.



Witnesses
Edward E. Taliaferro
Frank E. Ruth

By

Edward E. Taliaferro

Charles V. Church

his Attorney

Inventor

UNITED STATES PATENT OFFICE.

EDWARD E. TALIAFERRO, OF COLORADO SPRINGS, COLORADO.

TALKING-MACHINE MOTOR.

1,261,969.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed February 18, 1915, Serial No. 9,121. Renewed August 13, 1917. Serial No. 186,056.

To all whom it may concern:

Be it known that I, EDWARD E. TALIAFERRO, a citizen of the United States, residing at Colorado Springs, in the county of El Paso and State of Colorado, have invented certain new and useful Improvements in Talking-Machine Motors; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to talking machines and other devices for reproducing sound from a permanent record.

In talking machines of the present day the sound reproducing apparatus usually consists of a sound record having undulating grooves representing the sound waves recorded and a stylus vibrating in response to the undulations of the grooves. When it is desired to reproduce sound or play the selection the record, which is generally in the form of a disk or cylinder, is placed on a suitable turn-table or cylindrical support, as the case may be, and rotated against the stylus. The stylus travels in the sound grooves and vibrates in response to the undulations in the grooves, producing sounds corresponding to the sounds recorded, the sounds being amplified by a tone arm or horn. An important problem in the art of reproducing sound from a permanent record has been to provide a suitable motor for imparting the motion to the record support which motion will have the property of being uniform and continuous without variation. In the majority of cases, talking machines of the present day are equipped with spring motors and have given a limited degree of satisfaction when the sound record is not too long and if the spring is kept tightly wound continuously. A grave objection to the use of spring motors for sound reproducing purposes, however, lies in the fact that the power of the motor decreases in direct proportion to the unwinding of the spring, and consequently the speed of the record support gradually slackens as the record is played. This variation of motion causes the vibrations of the recording or reproducing stylus to become less and less frequent, which results in a continuous change in pitch of the sound recorded or re-

produced, as the case may be. Such changes of pitch are exceedingly annoying to the musical ear and have heretofore been a great drawback to the artistic development of the talking machine.

The object of my invention is to provide a motor for a record support which will have the property of continuously imparting a uniform motion to the support without any variation, and in which the same rate of movement is continuously maintained from the beginning of the record to its end, regardless of its length. Such a motor dispenses altogether with annoying changes in pitch of the sounds reproduced and consequently renders the playing of the record much more effective and a truer reproduction of the original selection.

The motor constructed in accordance with my invention will be automatically continuously wound without interfering with the direct drive of the record support and the rate of movement of the support will be the same when the motor is nearly unwound as at the beginning of its motion.

A full understanding of the invention will be attained from the following detailed description of a construction embodying the same in a preferred form, when taken in connection with the accompanying drawings, in which,

Figure 1 is a vertical section of a talking machine embodying the present improvements.

Fig. 2 is a section on the line 2-2 of Fig. 1.

Fig. 3 is a detail view of an improved make and break device incorporated in the electric circuit.

The talking machine shown in the drawings is of the cabinet or hornless type and consists generally of a cabinet A having a hinged top A' to permit access to the reproducer and turn-table chamber a, sound opening a' controlled by sound regulating doors a² and record cabinet a³.

In the present instance my invention has been adapted for use in connection with a talking machine of the disk type, that is the type in which the sound records containing the selections to be reproduced are in the form of disks. It will be understood, of course, that the invention is of equal application with other types of talking machines and that the illustration in the drawings is

merely for the purpose of showing one example in which the present improvements can be advantageously employed.

Mounted to rotate within the chamber *a* 5 is a turn-table B which forms a traveling support for the record disks, not shown, but which will be readily understood as being of a construction well known in the art. The reproducer C having a reproducing 10 stylus *c* is mounted over the turntable B on the end of the tone arm C' which arm is swiveled in the usual manner to the base *a*⁴ of the chamber *a* and is connected with an amplifying horn C² located within the cabi- 15 net and extending to the sound opening *a*'.

In the space below the chamber base *a*⁴ is mounted a casting D which casting may be of any suitable construction adaptable to form a support for the connections between 20 the improved motor for generating the rotary motion and the turn-table B. The turn-table B is mounted on the end of a shaft *b* for rotation with the shaft. Shaft *b* extends through the base *a*⁴ of the chamber *a* 25 and is journaled in the casting D. The shaft *b* carries, at its end opposite to the turntable, a pin *b*' which projects through a socket in the arm *d* of the casting D and frictionally engages a ball-bearing *d*' in the 30 bottom of the socket. Adjustment of the ball-bearing to vary its frictional engagement with the pin *b*' may be effected by means of an adjusting screw *d*². Fixed on the shaft *b* is a pinion *b*² which meshes with 35 a large gear *e* mounted on a shaft *e*' which is journaled at its ends in the extremities of the arms *d* and *d*³ of the casting D. The large gear *e* is adapted to be rotated by means of a drum E mounted on the shaft 40 *e*' when rotary motion is imparted to the drum by means of a falling weight, as will be presently described. Wound about the drum E is a cord *f* which cord is endless and extends from the drum E over a guide 45 roller *f*' around a pulley block *f*² from which is suspended a weight F. The weight F is adapted to travel within a hollow shaft or elongated chamber G suitably formed by partitions in the interior of the record cabi- 50 net A and falling of the weight within the shaft G pulls the cord *f* against the surface of the drum E and imparts a continuous uniform motion thereto which is transmitted to the turn-table through the gear connec- 55 tions above described. The advantage of employing a weight for rotating the drum E lies in the fact that the power of the weight is exactly the same when the weight is nearly at the end of its travel down the 60 shaft G as it is at the beginning of its travel, so that no appreciable variation of movement of the drum E results and the turn-table B is rotated with a continuous uniform movement.

65 The invention provides means for auto-

matically preventing the weight motor from becoming unwound, and for automatically returning the weight F to the upper portion of the shaft G before it reaches its end of travel down the shaft, so that no 70 matter when the turn-table brake is released, the motor is always in condition to impart a continuous, uniform rotary movement to the turn-table. This is a distinct advantage in the talking machine art, for not only is 75 the motor always responsive to rotate the turn-table upon release of the brake, but also any variation of movement during the progress of reproducing the sounds recorded on the record is altogether prevented, for 80 before the weight can reach a period in its travel when it would strike the bottom of the shaft, the automatic re-winding device becomes instantly effective to return the weight immediately to the top of the shaft. 85 For this purpose the endless weight bearing cord *f* extends from the power drum *E* around guide pulleys *h*, *h*' to and over a re-winding drum H, which when rotary motion is imparted thereto acts to draw the weight 90 F to the top of shaft G by exerting a positive pull on the endless cord *f*. From the winding drum H the cord *f* passes over idler rolls *i*, *i*' back to the pulley block *f*². As a result of this arrangement the rewinding 95 effect is applied to that portion of the cord *f* which is on the side of the weight F leading directly to the rewinding drum H, whereas the direct drive of the power drum E is transmitted from the portion of the 100 endless cord on the other side of the weight. Accordingly the power effect of the weight attached to the power drum is never removed, and is equally effective to positively rotate the power drum E, when the rewind- 105 ing drum H is returning the weight to the top of the shaft. The rewinding drum may be conveniently located in a chamber or shaft K inclosed within the cabinet of the talking machine, and positive rotary movement 110 is imparted thereto by an electric motor M at the desired time in the following manner:

The winding drum H is mounted on a shaft *h*² journaled in suitable brackets *h*³ resting on the base of the chamber K. Fixed 115 on the shaft *h*² is a large gear wheel *h*⁴ preferably of that type having helical teeth which are in mesh with the teeth of a pinion *m*, mounted on the motor shaft *m*' of the electric motor M. Current for operating 120 the electric motor M may be supplied through a plug N which can be connected in the usual manner to a main supply line, and, in houses where there is no electrical connection, storage batteries may be em- 125 ployed for supplying the power. The motor circuit designated by the line wires 1 and 2 is adapted to be controlled by the weight motor, in such manner that the motor M and rewinding drum H are directly 130

responsive to the weight motor, and act automatically to rewind it, when the weight F has reached a predetermined point of travel down the shaft G.

5 For this purpose, the circuit wires 1 and 2 are connected to a trip switch O carried by the weight F and movable with it. The preferred form of trip switch is one which will act positively to close the motor circuit
10 when the weight F has reached a predetermined position in its travel down the shaft G and also to positively open the motor circuit when the weight has reached a predetermined elevated position. A switch having these characteristics is illustrated in detail in Fig. 3. Mounted on the base *o* are
15 spring contact members *o'*, *o*², which are electrically connected with the line wires 1 and 2 respectively. The circuit is adapted to be opened and closed by an oscillatory switch member *o*³ which carries a trip arm or trigger *o*⁴ projecting beyond the weight F. The switch member is provided with insulated portions *o*⁵ and a conducting portion
20 *o*⁶. Accordingly, it will be understood that when the conducting portion is in engagement with the contact members *o'* and *o*², the motor circuit is closed, and rewinding of the weight motor commences. To insure
25 a positive action of the switch member, it is connected with a wire spring *o*⁷ arranged to snap it into make or break position with respect to the contact members when the trigger *o*⁴ is tripped. The entire switch
30 O, with the exception of the trigger *o*⁴ is preferably recessed in the weight to prevent interference with any of its parts by the side walls of the shaft G, so as to injure them. Projecting from a wall of the
35 shaft G are pins P, R, the pin P being at the upper portion of the shaft, and the pin R at the lower portion of the shaft and so arranged that it will strike the trigger *o*⁴ to close the motor circuit before the weight F
40 has reached the extreme lower limit of its travel. When the weight F has been elevated to such a degree that the trigger *o*⁴ strikes the pin P, the trigger is tripped to break the motor circuit and stop the re-
45 winding operation.

For the purpose of insuring a positive engagement of the cord *f* with the drums E and H, a supplementary weight S mounted on a pulley block *s* is provided around which
55 the cord *f* passes. The supplementary weight takes up any slack in the cord and may be conveniently located intermediate the guide rollers *h*, *h'*.

To further insure a uniform speed of the
60 sound record, the turn-table B is provided with a centrifugal governor T mounted on the shaft *b*, but slidable thereon. Attached to the governor T is a tube *t* also slidable on shaft *b*, and this tube carries at its lower
65 end a friction disk *t'*. Slidable on the shaft

is a second friction disk *t*² mounted on the end of a lever arm *t*³ pivoted on the casting D. The lever arm *t*³ is controlled by an adjusting screw *t*⁴. From the foregoing, it will be noted that adjustment of the screw
70 *t*⁴ will be effective to regulate the amount of friction between disks *t'*, *t*² and consequently the speed of the turn-table.

The turn-table brake V is of conventional type and in fact, any preferred form of
75 brake may be employed.

While I have shown and described a specific embodiment of my invention, it will be understood that the same is not to be limited to the details of construction, but on
80 the contrary is capable of wide modification and variation within the scope of the claims.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent is,—
85

1. In a talking machine, the combination of a sound record support, and a driving mechanism for furnishing constant, uniform driving power to the sound record support, embodying a weight motor having a
90 driving connection with the sound record support and opposing the resistance to drive of said support with constant uniform power, and means operable before the weight motor has exhausted its driving
95 power to rewind the weight motor without removing from the sound record support the direct drive by the weight motor.

2. In a talking machine, the combination of a sound record support, and a driving
100 mechanism for furnishing constant, uniform driving power to the sound record support, embodying a weight motor having a driving connection with the sound record support and opposing the resistance to drive of said
105 support with constant uniform power, and electrically operated connections operable automatically before the weight motor has exhausted its driving power to rewind the weight motor without removing from the
110 sound record support the direct drive by the weight motor.

3. In a talking machine, the combination of a sound record support, and a driving
115 mechanism for furnishing constant, uniform, driving power to the sound record support, embodying a weight motor having a driving connection with the sound record support and opposing the resistance to drive of said support with constant, uniform
120 power, a winding drum for rewinding the weight motor without removing from the sound record support the direct drive by the weight motor, and an electric motor connected to the winding drum and automatically
125 operative before the weight motor becomes unwound.

4. In a talking machine, the combination of a sound record support, and a driving
130 mechanism for furnishing constant, uniform

driving power to the sound record support, embodying a weight motor having a driving connection with the sound record support and opposing the resistance to drive of said support with constant, uniform power, a winding drum for rewinding the weight motor without removing from the sound record support the direct drive by the weight motor, and means for energizing the winding drum before the weight motor becomes unwound.

E. E. TALIAFERRO.

Witnesses:

MYRA A. ALLEN,
HOMER D. GRAHAM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH STOP.

1,261,990 ----- M. Adair,
Filed June 17, 1916,
Patented Apr. 9, 1918.

M. ADAIR.
 PHONOGRAPH STOP.
 APPLICATION FILED JUNE 17, 1916.

1,261,990.

Patented Apr. 9, 1918.
 2 SHEETS—SHEET 1.

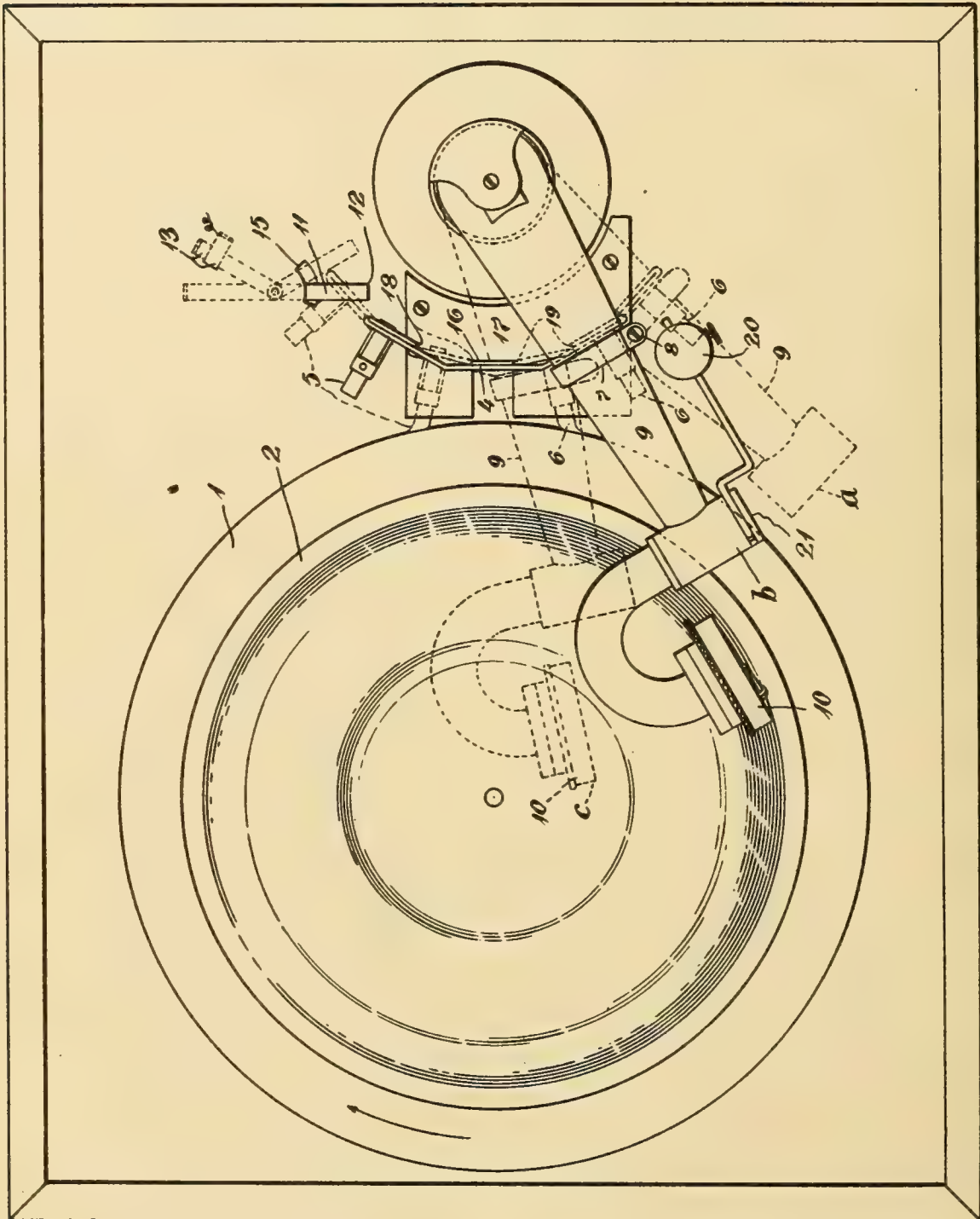
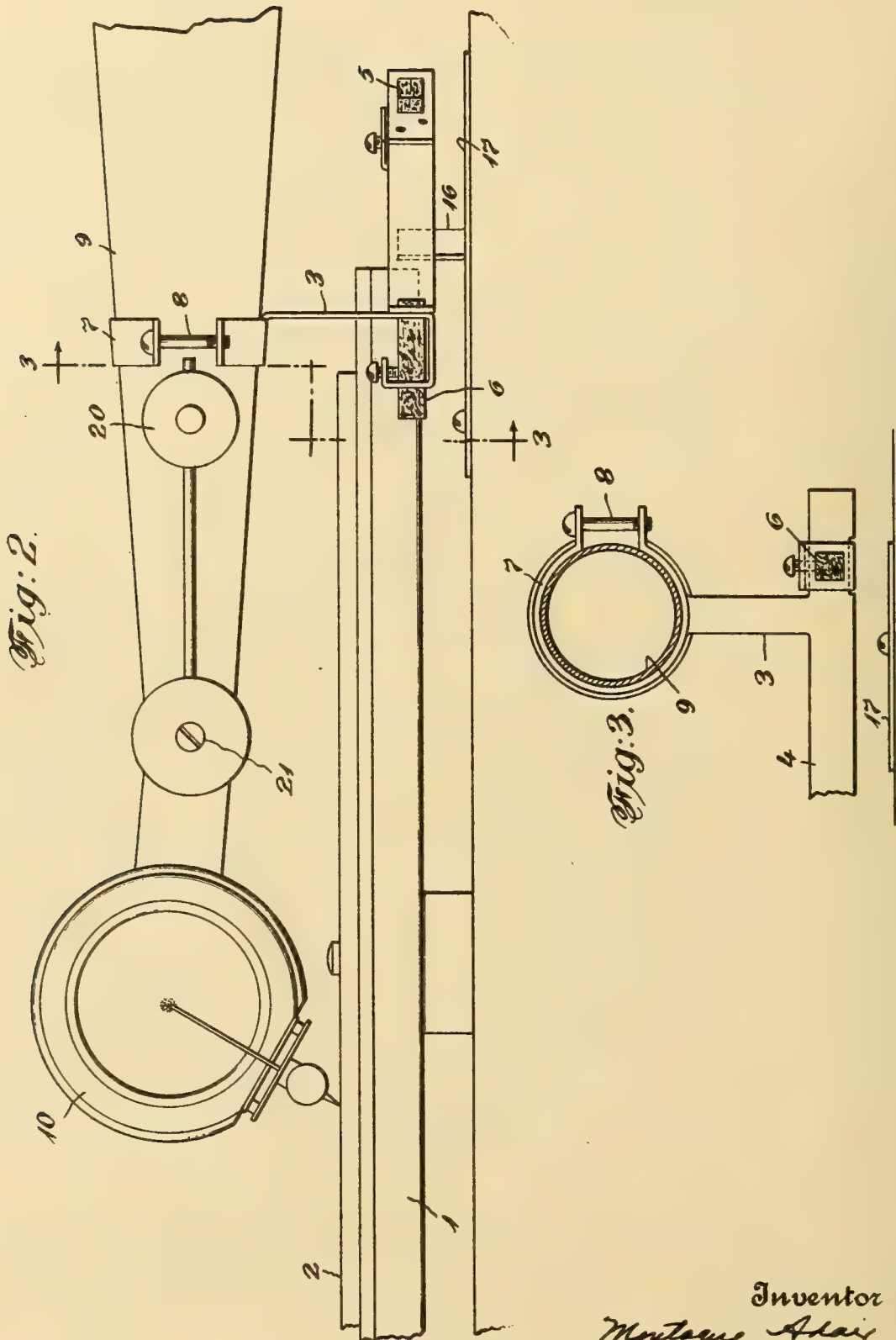


Fig. 1.

Inventor
 Montague Adair
 By his Attorney
 Melvin Becken

1,261,990.

Patented Apr. 9, 1918.
 2 SHEETS—SHEET 2.



Inventor
 Montague Adair
 By *h* Attorney
 Melv Decker

UNITED STATES PATENT OFFICE.

MONTAGUE ADAIR, OF BROOKLYN, NEW YORK.

PHONOGRAPH-STOP.

1,261,990.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Original application filed January 27, 1916, Serial No. 74,682. Divided and this application filed June 17, 1916, Serial No. 104,161.

To all whom it may concern:

Be it known that I, MONTAGUE ADAIR, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Phonograph-Stops, of which the following is a specification.

This invention relates generally to stopping mechanisms for sound reproducing devices and more particularly to that type of sound reproducers in which the record takes the form of a disk.

This application is a division of my prior application Serial No. 74682, filed January 27, 1916, and has for an object the provision of a braking device which will automatically stop the operation of the mechanism when the tone arm is in a non-playing position.

This object is attained by mounting a braking element on the tone arm in such a manner that the brake is applied in either of the non-playing positions to which the tone arm can be moved.

In the accompanying drawings in which like reference numerals designate like parts,

Figure 1 is a plan view of a preferred embodiment of the invention showing the tone arm with the attached braking device in a plurality of positions.

Fig. 2 is a side elevation of the complete device.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2.

In the drawing the numeral 1 designates the rotatable record support for the record disk 2. At 3 is shown a braking device which comprises the supporting member 4 carrying the braking elements 5 and 6. The supporting member 4 is attached to the tone arm by means of the clamp 7 and the screw 8. The braking elements are preferably made of leather and adapted in different positions of the tone arm 9 to which they are carried to engage the periphery and thereby stop the rotation of the record carrier 1.

In the position of the tone arm indicated at *a* in Fig. 1 of the drawing, which is the position occupied by the arm when the sound box is removed from the record for the purpose of changing records, the braking shoe 5 is brought into engagement with the record support. In the position shown at *c* in Fig.

1, which is substantially the position the arm takes when the stylus has reached the termination of the groove zone, the brake shoe 6 is brought into engagement with record support 1. Thus it will be seen that in the two extreme positions to which the arm can be moved a brake is automatically applied to the record support to stop the rotation thereof, while at the position *b* in Fig. 1 the record carrier is free to begin its rotation.

In the innermost position of the tone arm indicated at *c*, the brake shoe 6 can be arranged to be applied just as the stylus reaches the final convolution of the groove, or the sound box 10 can be moved inwardly a slight additional distance either automatically by means such as are disclosed in the application of which this case is a division, or manually in the act of swinging the sound box 10 back onto the tone arm for the purpose of changing needles. The two positions therefore in which the braking device is actuated are the natural ones which the tone arm occupies in the ordinary operation of the machine.

A switch, indicated at 11 in Fig. 1, for controlling the circuit to the driving motor when an electric type of motor is employed may be used in conjunction with the braking device 3. In the position of the tone arm indicated at *c*, the member 4 engages the arm 12 of the switch 11 to break the circuit controlled thereby. The switch contacts 13 are placed beneath the top 14 of the motor casing while the arm 12 projects outwardly through the slot 15 to a position in which the arm 12 can be engaged by the adjacent end of the braking device 3.

A stop lug 16 projects upwardly from a supporting plate 17 and acts as a guide for the supporting member 4 of the braking device 3 and as a stop for the braking device when the brake shoe 5 is in engagement with the record carrier 1. In this position of the braking device the stop lug 16 is engaged by the shoulder 18 formed by the reinforced end of the member 4 to prevent unnecessary movement of the braking device 3. In the same manner the stop lug 16 is engaged by the shoulder 19 when the brake shoe 6 is in braking position.

It will be seen that in the position of the tone arm shown at *c* the brake is automatically applied while the stylus is being re-

moved and a fresh one substituted therefor. In a subsequent movement of the tone arm from the position *c* to the position *a* for the purpose of leaving the record support free
 5 in order that a change of records may be made, the brake member 6 will be removed from engagement with the record carrier and the brake shoe 5 will immediately be brought into engagement with the record
 10 carrier to hold the same while the change of records is being made. The braking device carried by the tone arm is effective, therefore, to stop the operation of the mechanism in the two natural nonplaying positions of
 15 the tone arm.

At 20 is shown a counter-weight which is used to counter-balance the weight of the sound box 10. The counter-weight 20 is pivoted at 21 with a one-way hinge connection by means of which the counter-weight
 20 will not interfere with the raising of the sound box 10 to a position where it rests on the tone arm.

What is claimed, is:

25 1. A sound reproducer stopping device comprising: a record disk having a zone of grooves, a rotatable record carrier, a swinging tone arm, a braking device carried by the tone arm and arranged to engage the ro-
 30 tatable record carrier when said swinging tone arm is swung to a position out of engagement with said record to prevent rotation of said rotatable support.

2. A sound reproducer stopping device
 35 comprising: a record disk having a zone of grooves, a swinging tone arm, a braking device carried by the tone arm and constructed and arranged to automatically stop the rotation of the record carrier when said swing-
 40 ing tone arm is swung to a position out of engagement with the record.

3. A sound reproducer stopping device comprising: a record disk having a zone of grooves, a rotatable record carrier, a tone
 45 arm adapted to be moved to and fro across the zone of grooves, and a braking device carried by the arm and arranged to engage the rotatable record carrier at the extremity of each movement of said arm.

50 4. A sound reproducer stopping device comprising: a record disk having a zone of grooves, a rotatable record carrier, a tone arm movable to two nonplaying positions, and a braking device mounted on said arm
 55 arranged to stop the rotation of the record

support in either of said positions of the tone arm.

5. A sound reproducer stopping device comprising: a record disk having a zone of grooves, a rotatable record carrier, a tone
 60 arm movable to a plurality of non-playing positions and a braking device mounted on said arm arranged to engage the record support in either of said positions to stop the rotation thereof. 65

6. A sound reproducer stopping device comprising: a record having a zone of grooves, mechanism for giving motion to the record, a movable member adapted to move across the zone of grooves, a braking device
 70 for the mechanism actuated by the movable member at either extremity of the movement thereof, and a circuit controller adapted to be operated by the braking device.

7. A sound reproducer stopping device
 75 comprising: a record having a zone of grooves, a record carrier, a movable member adapted to move across the zone of grooves, a braking device adapted to be moved by the movable member into engage-
 80 ment with the record carrier when the movable member is at either side of the groove zone, and a circuit controller adapted to be actuated by said braking device.

8. A sound reproducer stopping device
 85 comprising: a record having a zone of grooves, a record carrier, a movable member adapted to move across the zone of grooves in the operation of the device, and a braking device carried by the movable member com-
 90 prising a pair of brake shoes one or the other of which is adapted to engage the record carrier at the extremity of each movement of said movable member.

9. A sound reproducer stopping device
 95 comprising: a record having a zone of grooves, a record carrier, a movable member adapted to move across the zone of grooves in the operation of the device, a braking device carried by the movable mem-
 100 ber comprising a pair of brake shoes one or the other of which is adapted to engage the record carrier at the extremity of each movement of said movable member, and a circuit controller adapted to be operated by said
 105 movable member.

Signed at New York in the county of New York and State of New York this 14th day of June A. D. 1916.

MONTAGUE ADAIR.

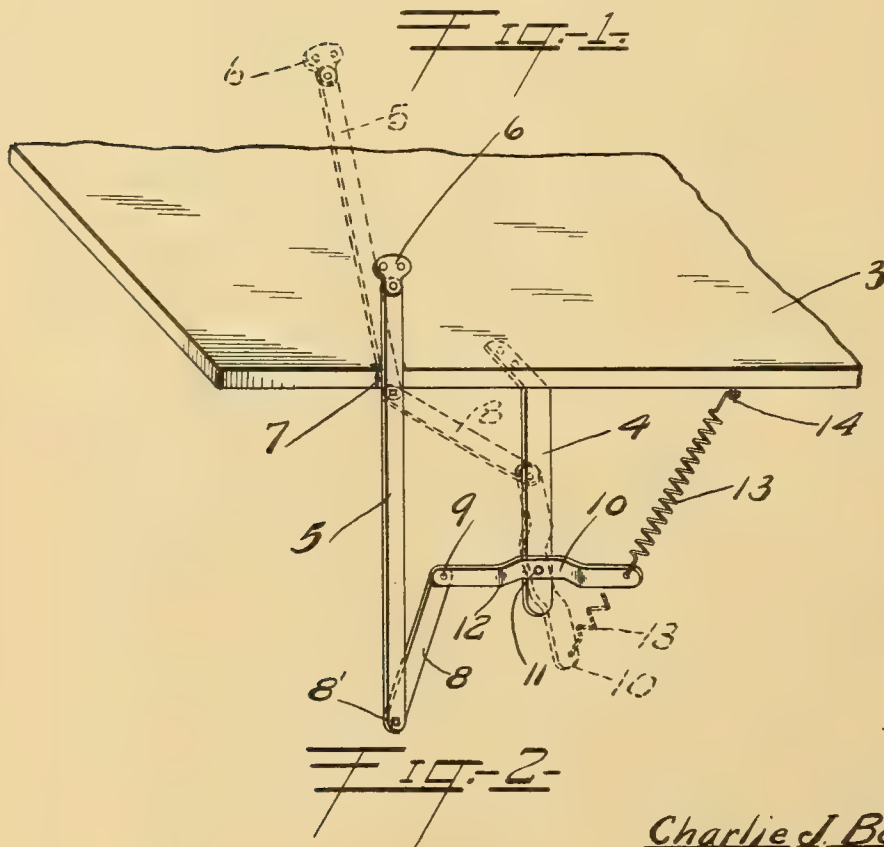
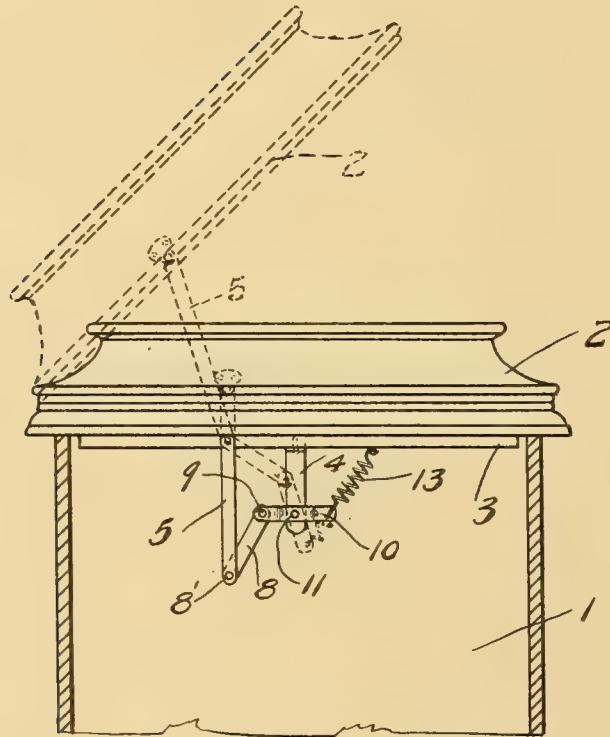
HINGED COVER SUPPORT.

1,262,167 ----- C. J. Bousfield,
Filed Feb. 9, 1917,
Patented Apr. 9, 1918.

C. J. BOUSFIELD.
HINGED COVER SUPPORT.
APPLICATION FILED FEB. 9, 1917.

1,262,167.

Patented Apr. 9, 1918.



Inventor
Charles J. Bousfield
Attorney
Edward R. Monroe.

UNITED STATES PATENT OFFICE.

CHARLIE J. BOUSFIELD, OF BAY CITY, MICHIGAN, ASSIGNOR TO THE DELPHEON COMPANY, OF BAY CITY, MICHIGAN, A CORPORATION OF MICHIGAN.

HINGED-COVER SUPPORT.

1,262,167.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed February 9, 1917. Serial No. 147,624.

To all whom it may concern:

Be it known that I, CHARLIE J. BOUSFIELD, a citizen of the United States of America, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Hinged-Cover Supports, of which the following is a specification.

This invention relates to hinged cover supports for talking machine cabinets and the like.

One object of my invention is to provide means for holding the cover open through the instrumentality of suitable mechanism controlled by the tension of a spring.

Another object resides in the provision of means whereby the tension of the spring is exerted only when the cover is in open position.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportion and minor details without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Figure 1 is a partial sectional side elevation of a talking machine cabinet equipped with my improved cover supporting means, showing the mechanism in two different positions.

Fig. 2 is an enlarged isometric view of the mechanism comprising the supporting means.

In the drawings, 1 indicates a talking machine cabinet, of the type now in general use, provided with the usual hinged cover 2 and motor board 3. A supporting member 4 is suspended from the motor board 3 which member carries the mechanism of the cover supporting means.

The cover supporting mechanism comprises a substantially vertical rod 5 pivoted at one end to the cover 2 by means of the bracket 6. The rod 5 extends downwardly into the cabinet through a small slot 7 in the motor board 3 and to the free end of said rod is pivoted one end of a bar 8 by means of the pivot pin 8'. The opposite end of

the bar 8 is pivoted at 9 to one end of a lever 10 which lever 10 is pivoted intermediate its ends to the supporting member 4, as shown at 11. The lever 10 is offset intermediate its length, as indicated by the numeral 12 to allow sufficient space for the member 8 to pass between the supporting member 4 and the member 10 when the cover is raised. To one end of this member 10 is secured one end of the spring 13, the opposite end of the spring being secured to a screw member 14 set in the motor board 3. The aforementioned pin 8' has an enlarged head at each end thereof which acts as a stop against the motor board 3 when the cover is raised, thereby limiting the stroke of the mechanism.

When the cover is closed the mechanism assumes the position clearly shown in Fig. 2, in which position the spring 13 is under no tension whatever, and the weight of the cover itself tends to keep the same in closed position. When however, the cover is raised to the position as shown in Fig. 1, the mechanism assumes the position shown in the dotted lines. In this position the rod 5 is drawn out of the cabinet through the slot 7 until the enlarged heads of the pivot pin 8' engage the under side of the motor board and thereby limit the upward movement of the cover. By this movement the lever 10 is swung on its pivot 11 until the said lever 10 and bar 8 form a knee, as clearly shown in Fig. 2. This movement puts the spring 13 under tension, as shown, said tension being exerted against the knee formed by the lever 10 and bar 8. It will thus be apparent that by reason of the spring 13 pulling upward on the free end of the lever 10, the tendency of the knee is to straighten out, and thus the rod is pushed upwardly and held in its extended position, thereby holding the cover in open position.

From the foregoing, it will be apparent that I have produced a simple and easily assembled device capable of resiliently holding the cover in its open position. By means of the mechanism described, it will be obvious that the spring is put under tension only when the cover is open and thus the strength of the spring is not used when the cover is closed, thereby assuring longer and more efficient use of the spring. Furthermore, by reason of the fact that the rod 5

moves in a substantially vertical plane, it is only necessary to provide a very small slot in the motor board 3, and therefore the use of the customary elongated slot in the motor board, which serves as an inlet for dust and dirt into the entrance of the cabinet, is obviated.

What I claim is:—

1. Means for supporting a hinged cover, comprising a member depending from the cover, a pivoted lever normally occupying a position about parallel with the cover when the latter is closed, a bar pivotally connected at its ends with the lower end of the depending member and lever, respectively, and a spring connected with the lever and subjected to tension upon opening the cover and re-acting through the changed relation of the lever, bar and depending member to press the latter upward and hold the cover open.

2. In a supporting device for a hinged cover, a rod pivoted to said cover, a pivoted lever, an intermediate bar having its opposite ends pivoted to the respective ends of the rod and lever and directed downward when the cover is closed, and a spring connected to said lever whereby when the cover is open said bar is directed upward and maintained in elevated position by means of the said spring to hold the cover in open position.

3. In a supporting device for a hinged cover, a rod pivoted to said cover, a pivoted lever, an intermediate bar pivoted to the opposite ends of the rod and lever, said lever and bar adapted to form a knee, and a spring secured to the lever and adapted to be put under tension when the cover is opened to hold said knee in extended position, whereby said rod is pushed upwardly to the limit of its travel to hold said cover in its open position.

4. In a supporting device for a hinged cover, a rod pivoted to said cover, a pivoted lever, an intermediate bar pivoted between the opposite ends of the rod and lever, said lever and bar adapted to form a knee, the lever being offset intermediate its length, and a spring attached to said lever, said spring being put under tension when said cover is raised to hold said knee in extended

position, to push said rod upwardly and hold said cover in its open position.

5. Means for supporting the hinged cover of a talking machine cabinet, comprising a substantially horizontally disposed member pivoted to the cabinet, a second member depending from the cover and extending to a point below the horizontally arranged member when the cover is closed, a link connecting the lower end of the depending member with the contiguous end of the horizontal member, and a spring co-acting with the horizontal member and tensioned when the cover is opened to press the said depending member upward and hold the cover in open position.

6. Means for supporting the hinged cover of a talking machine cabinet, comprising a substantially horizontally disposed member pivoted within the cabinet below the motor board, a second member depending from the cover and passing through an opening in the motor board to a point below the horizontally arranged member when the cover is closed, a stop on the lower end of the depending member to engage the motor board and limit the opening of the cover, a link connecting the lower end of the depending member with the contiguous end of the horizontal member, and a spring co-acting with the horizontal member and tensioned when the cover is open to press the said depending member upward and hold the cover in open position.

7. In a device of the character described, a cabinet, a hinged cover for said cabinet, a motor board supported in the cabinet and provided with a small slot, a supporting member suspended from said motor board, a rod connected to the cover and extending through the slot into the cabinet, a lever pivoted to the supporting member, an intermediate bar pivoted between said rod and lever, said bar and lever adapted to form a knee, and a spring connected to the lever and put under tension when said cover is raised to hold said knee in extended position, whereby said rod is pushed upwardly and the cover held in its open position.

In testimony whereof I affix my signature.

CHARLIE J. BOUSFIELD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

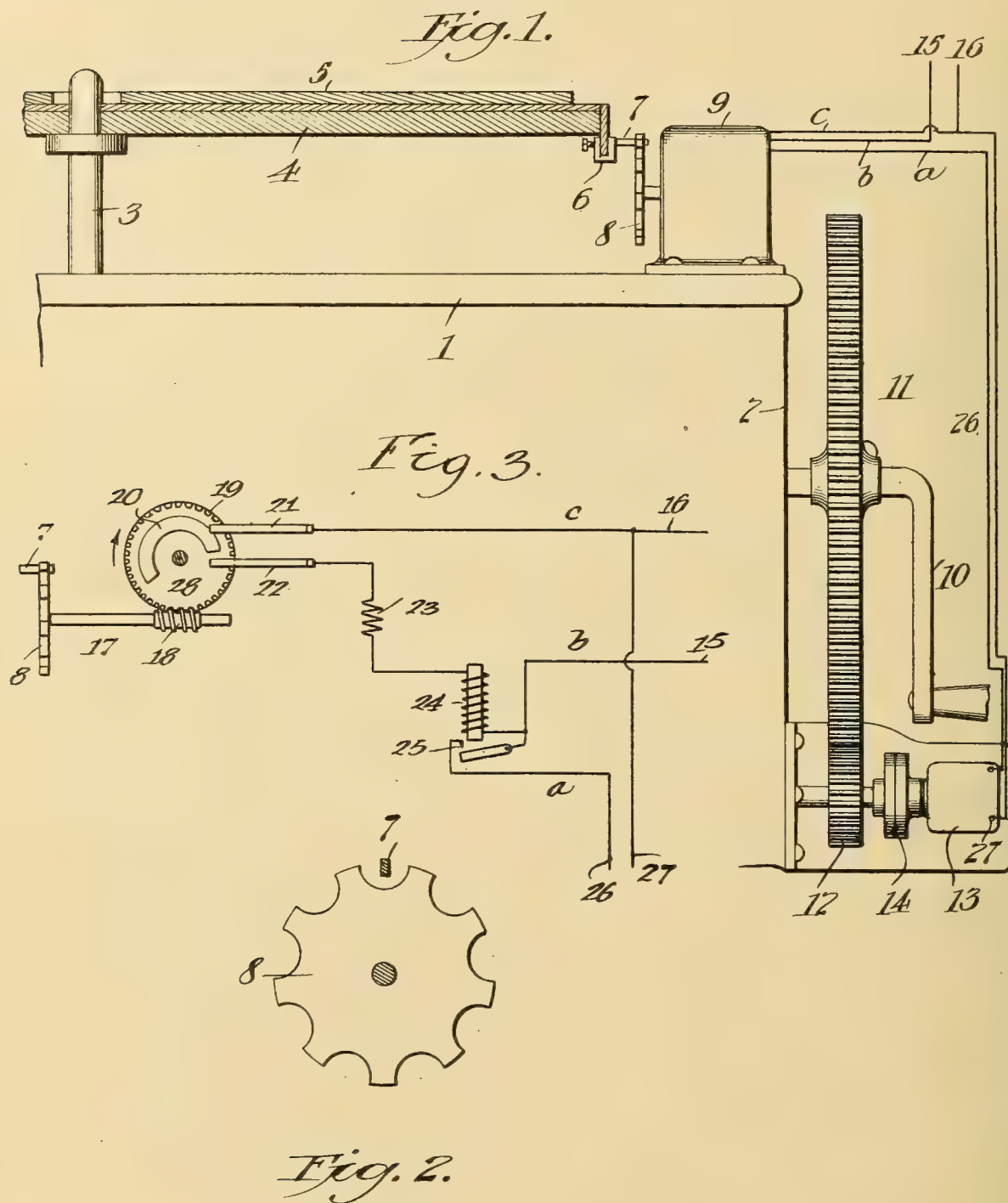
DRIVING MEANS FOR TALKING MACHINES.

1,262,415 ----- H. R. Van Deventer,
Filed Oct. 12, 1914,
Patented Apr. 9, 1918.

H. R. VAN DEVENTER,
DRIVING MEANS FOR TALKING MACHINES.
APPLICATION FILED OCT. 12, 1914.

1,262,415.

Patented Apr. 9, 1918.



Witnesses
T. L. Mochman
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Inventor
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By

Attorney

UNITED STATES PATENT OFFICE.

HARRY RANDOLPH VAN DEVENTER, OF SUMTER, SOUTH CAROLINA, ASSIGNOR TO
SPLITDORF ELECTRICAL COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION
OF NEW JERSEY.

DRIVING MEANS FOR TALKING-MACHINES.

1,262,415.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed October 12, 1914. Serial No. 866,270.

To all whom it may concern:

Be it known that I, HARRY RANDOLPH VAN DEVENTER, a citizen of the United States, residing at Sumter, in the county of Sumter and State of South Carolina, have invented certain new and useful Improvements in Driving Means for Talking-Machines, of which the following is a specification, reference being had to the accompanying drawing.

This invention relates to automatic winding means for talking machines and contemplates the provision of mechanical means that can be attached to the ordinary talking machine commonly provided with manual means for winding, whereby without interfering with said manual means, the machine may be automatically wound.

A further object is to provide a talking machine with winding means that will operate when the spindle carrying the sound record has made a certain predetermined number of revolutions.

Another object is to provide a device that will not wind the talking machine motor too tight.

There are other objects as hereinafter described and claimed.

In the accompanying figures, Figure 1 is a diagrammatic view partly in section of the attachments as applied to a disk talking machine, such as the Victrola. Fig. 2, a view of the impulse wheel used in the control device, and Fig. 3, a diagram showing how the control of the winding motor may be accomplished. Like figures of reference denote the same parts wherever they are shown.

1 denotes the top of the talking machine, and 2 the side thereof. 3 is a vertically projecting spindle on the top of which is supported the table 4 for the purpose of holding the sound record 5. Usually 4 is provided with a flange and clamped to the edge of this is the member 6 having a projecting pin 7 adapted to engage the star wheel 8 of the control mechanism 9.

Talking machines are usually provided with a crank 10 which is so connected to the driving motor, that the motor is wound by rotating the crank in one direction, the crank remaining stationary while the motor is running. I clamp to this winding crank a suitable gear 11, or the crank 10 may be

entirely taken off and the gear 11 mounted on a new shaft engaging the winding mechanism in place of the crank.

Meshed with 11 is a suitable gear 12 connected to an electric motor 13. 12 may be directly on the shaft of 13 or interposed between the motor and gear may be any suitable clutch 14, to prevent overwinding, as it is obvious that when the tension of the spring overcomes the friction of clutch 14, that 14 will slip and thereby prevent overwinding or stalling the motor.

The control mechanism 9 may be of any suitable character, either a suitable electric device or a clock work arranged to perform the following functions:

(a) The number of revolutions that table 4 is to make with one winding of its driving motor having been decided upon, say 500, the control mechanism is so arranged that upon the completion of the aforesaid number of revolutions, an electrical circuit from a suitable current source to which the wires 15 and 16 lead is closed to the electric motor 13. (b) The electric motor 13 is permitted to run, thereby rewinding the spring motor. (c) When the spring motor is rewound to a predetermined point, the electrical circuit through winding motor 13 is broken.

The foregoing may be accomplished in many ways that will suggest themselves to those skilled in the art and for the sake of illustration, I show in Fig. 3 one arrangement by which the foregoing results may be accomplished. I deem this and all other arrangements within the scope of my invention, which consists broadly in having a controlling mechanism operated by the revolving table of a talking machine and forming an attachment thereto, which controls the circuit to an electric winding motor.

Referring to Fig. 3, wheel 8 is connected to the shaft 17 provided with a worm 18, which is meshed with the gear 19 which carries the segment 20 adapted to close the circuit between brushes 21 and 22, thus permitting current to flow over conductor 16 to brush 21 to segment 20, to brush 22, when the segment is between the brushes, through resistance 23, through a winding on relay 24 and over conductor 15. This causes relay 24 to close its contact 25 and permit current to flow through conductor 26 to motor 13,

the circuit being completed over conductor 27 to 16. It will be observed that with gear 19 rotating in the direction of the arrow, the brushes 21 and 22 will be connected to each other while segment 20 is sliding under them. The length of segment 20 is readily calculated so that the duration of time during which the current is connected to the motor 13 is just sufficient to rewind the spring motor of the talking machine to the same tension that it was before table 4 made the 500 revolutions before referred to.

Now it may be possible that instead of the gear 19 coming to rest, so that brush 22 would be in the space 28, in other words, so that no current was flowing, that the device might stop with brushes 21 and 22 in contact, therefore I provide a suitable resistance 23 so proportioned that if the current is allowed to flow through same a longer time than is approximately necessary for the motor 13 to rewind the spring to the desired point, 23 will heat and thereby its resistance increase to the point where relay 24 will no longer hold its contact 25 closed, and will thereby release its contact and open the circuit through the motor.

While I have described and shown one method of controlling the electric motor, it will be understood that other methods may be used without departing from the spirit of the invention as set forth in the appended claims.

I am aware that it is old to equip talking machines with electrically driven winding motors, but I claim as new the controlling device and electric motor attachment herein described, both of which may be readily attached to talking machines already in service.

I claim—

1. An attachment for spring motor operated talking machines of the motor inclosed type, including in combination, an inclosed electric motor located outside of the casing of the talking machine, driving connections between the electric motor and the normal spring winding shaft, and controlling means located outside of the casing and operated by a movable part of the talking machine normally outside of the casing for controlling the operation of the electric motor, whereby said electric motor automatically maintains said spring motor wound.

2. An attachment for spring motor operated talking machines of the motor inclosed type including in combination, an inclosed electric motor located outside of the casing of the talking machine, driving connections between the electric motor and the normal spring winding shaft, and controlling means located outside of the casing and operated by a movable part of the talking machine normally outside of the casing for

completing the circuit to cause the electric motor to wind the machine and for breaking the circuit when said spring motor is wound.

3. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, driving connections between the electric motor and the spring winding mechanism, controlling means operated by a moving part of the talking machine for completing the circuit to cause the electric motor to wind the machine, and means for stopping the motor to prevent overwinding provided the talking machine stops with the circuit completed.

4. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, and driving connections between the electric motor and the spring winding mechanism, said driving connections including a friction clutch adapted to slip to prevent overwinding of the talking machine, controlling means operated by a moving part of the talking machine for completing the circuit to cause the electric motor to wind the machine, and means for stopping the motor to prevent overwinding provided the talking machine stops with the circuit completed.

5. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, driving connections between the electric motor and the spring winding mechanism, and inclosed controlling means operated by the rotating table of the talking machine for completing the circuit to cause the electric motor to wind the machine.

6. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, driving connections between the electric motor and the spring winding mechanism, and inclosed controlling means operated by the rotating table of the talking machine for completing the circuit to cause the electric motor to wind the machine, said controlling means also operating to break the circuit to stop the electric motor after a predetermined number of revolutions of the table.

7. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, driving connections between the electric motor and the spring winding mechanism, inclosed controlling means operated by the rotating table of the talking machine for completing the circuit to cause the elec-

tric motor to wind the machine, and means for stopping the motor to prevent overwinding provided the table stops with the circuit completed.

5 8. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, driving connections between the electric motor and the spring winding mechanism, inclosed controlling means operated by the rotating table of the talking machine for completing the circuit to cause the electric motor to wind the machine, said controlling means also operating to break the circuit to stop the electric motor after a predetermined number of revolutions of the table, and means for stopping the motor to prevent overwinding provided the table stops with the circuit completed.

9. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, driving connections between the electric motor and the spring winding mechanism, inclosed controlling means operated by the rotating table of the talking machine for completing the circuit to cause the electric motor to wind the machine, a relay, contacts controlled thereby, and means operated to open the relay to stop the electric motor provided the table stops with the circuit completed.

10. An attachment for spring motor operated talking machines including in combination, an inclosed electric motor attached to the outside of the casing of the talking machine, driving connections between the electric motor and the spring winding mechanism, inclosed controlling means operated by the rotating table of the talking machine for completing the circuit to cause the electric motor to wind the machine, a relay, contacts controlled thereby, and a resistance in circuit with the relay, said resistance operating to open the relay to prevent overwinding provided the table stops with the circuit completed.

11. The combination with driving means for a talking machine including a spring motor, of an electric motor, driving connections between the electric motor and the spring motor for winding the spring motor, controlling means operated by a moving part of the talking machine for completing the circuit to cause the electric motor to wind the machine, and means for stopping the motor to prevent overwinding provided the talking machine stops with the circuit completed.

12. The combination with driving means for a talking machine including a spring motor, of an electric motor, driving connections between the electric motor and the spring motor for winding the spring motor, controlling means operated by a moving part of the talking machine for completing the circuit to cause the electric motor to wind the machine, a relay, contacts controlled thereby, and means for operating the relay to stop the electric motor to prevent overwinding provided the talking machine stops with the circuit completed.

13. The combination with driving means for a talking machine including a spring motor, of an electric motor, driving connections between the electric motor and the spring motor for winding the spring motor, said driving connections including a friction clutch for preventing overwinding, controlling means operated by a moving part of the talking machine for completing the circuit to cause the electric motor to wind the machine, said controlling means also operated to stop the electric motor when the spring has been rewound provided the operating machine continues its operation, and means for stopping the electric motor to prevent overwinding of the spring provided the talking machine stops with the circuit completed.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HARRY RANDOLPH VAN DEVENTER.

Witnesses:

EDNA B. ISLER,
E. H. RHAME.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



COIN FREED GRAMOPHONE.

1,262,521 ----- J. W. Knights,
Filed Feb. 18, 1915, Renewed Feb. 19, 1918,
Patented Apr. 9, 1918.

J. W. KNIGHTS.
COIN FREED GRAMOPHONE.

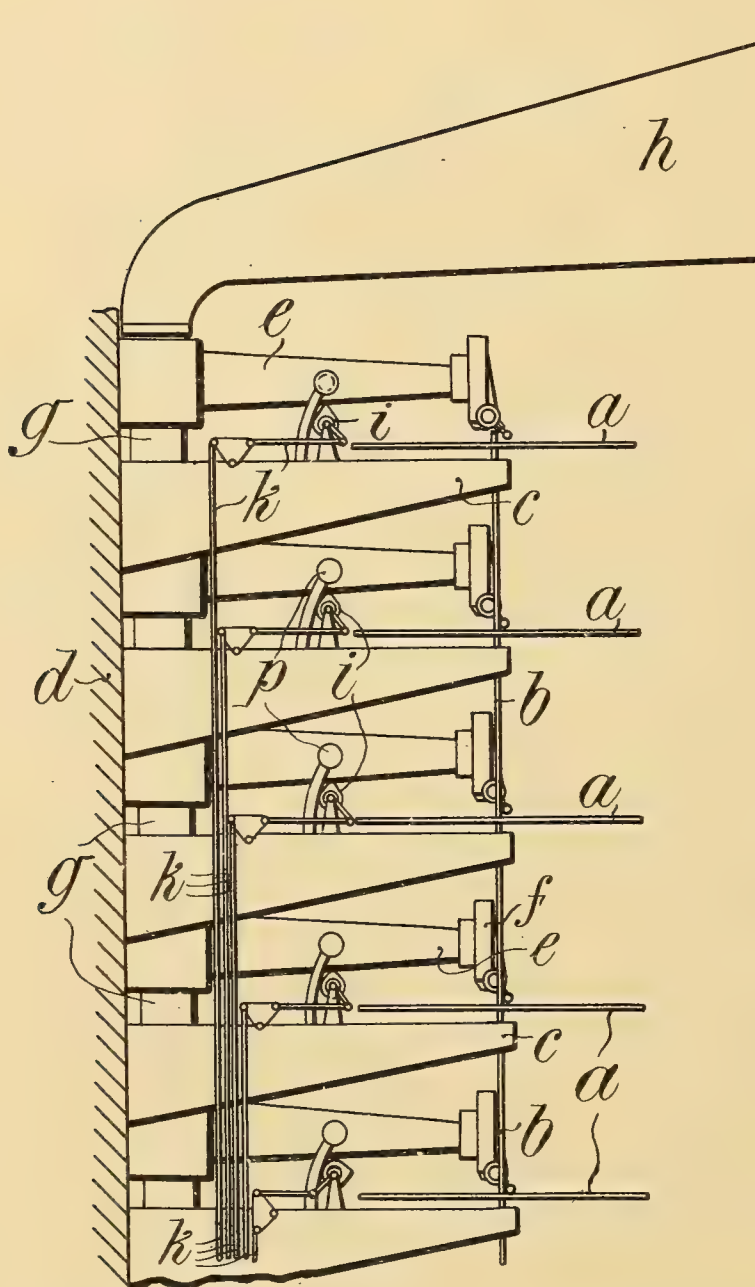
APPLICATION FILED FEB. 18, 1915. RENEWED FEB. 19, 1918.

1,262,521.

Patented Apr. 9, 1918.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES,

John R. Cay.
David R. Wagner.

INVENTOR,

James W. Knights,

BY

E. G. Siggers.
ATTY.

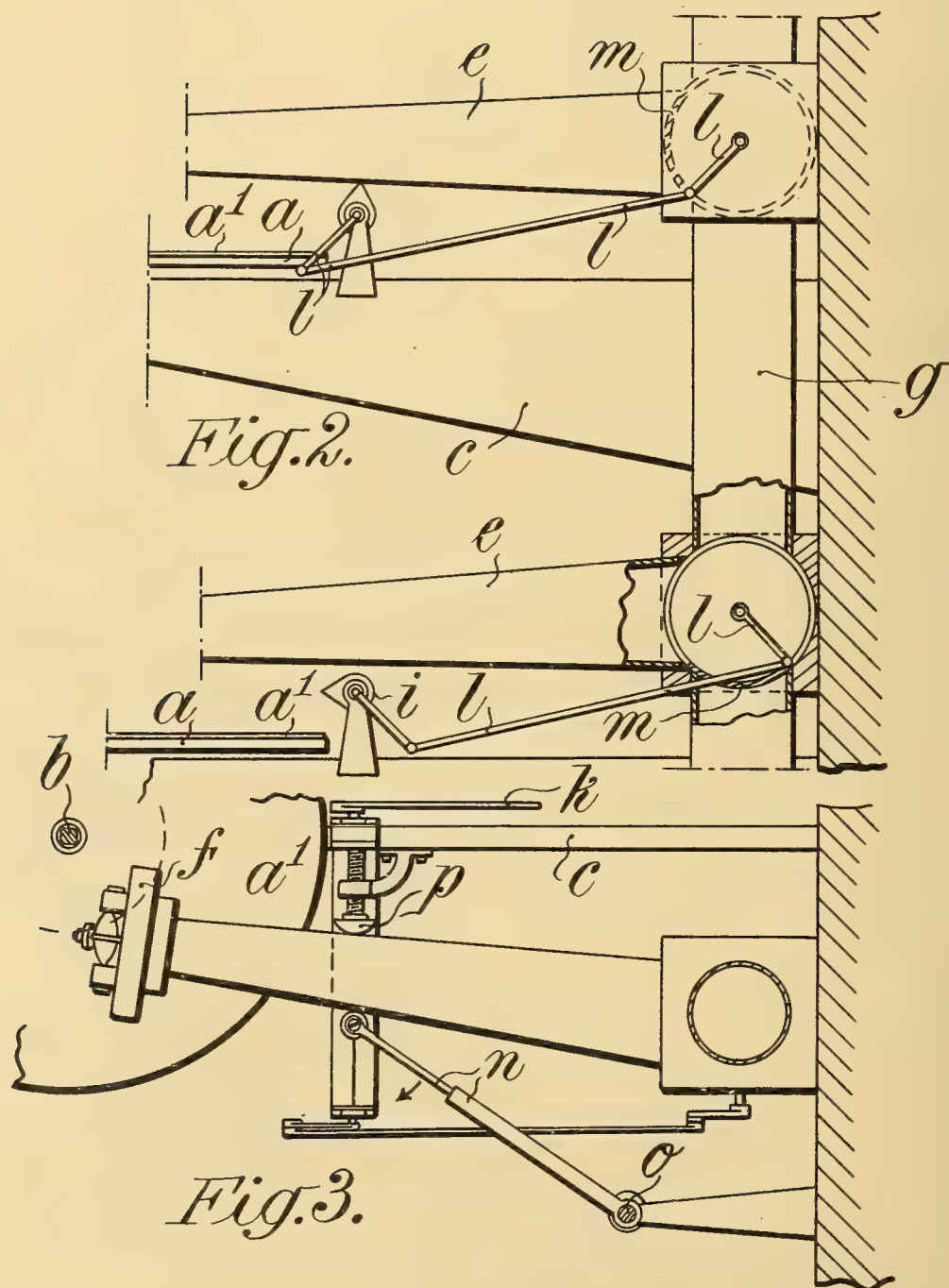
J. W. KNIGHTS.
COIN FREED GRAMOPHONE.

APPLICATION FILED FEB. 18, 1915. RENEWED FEB. 19, 1918.

1,262,521.

Patented Apr. 9, 1918.

3 SHEETS—SHEET 2.



WITNESSES.

John R. Ray.
David R. Wagner

INVENTOR,
James W. Knights,

BY
E. J. Siggers
ATTY.

J. W. KNIGHTS.

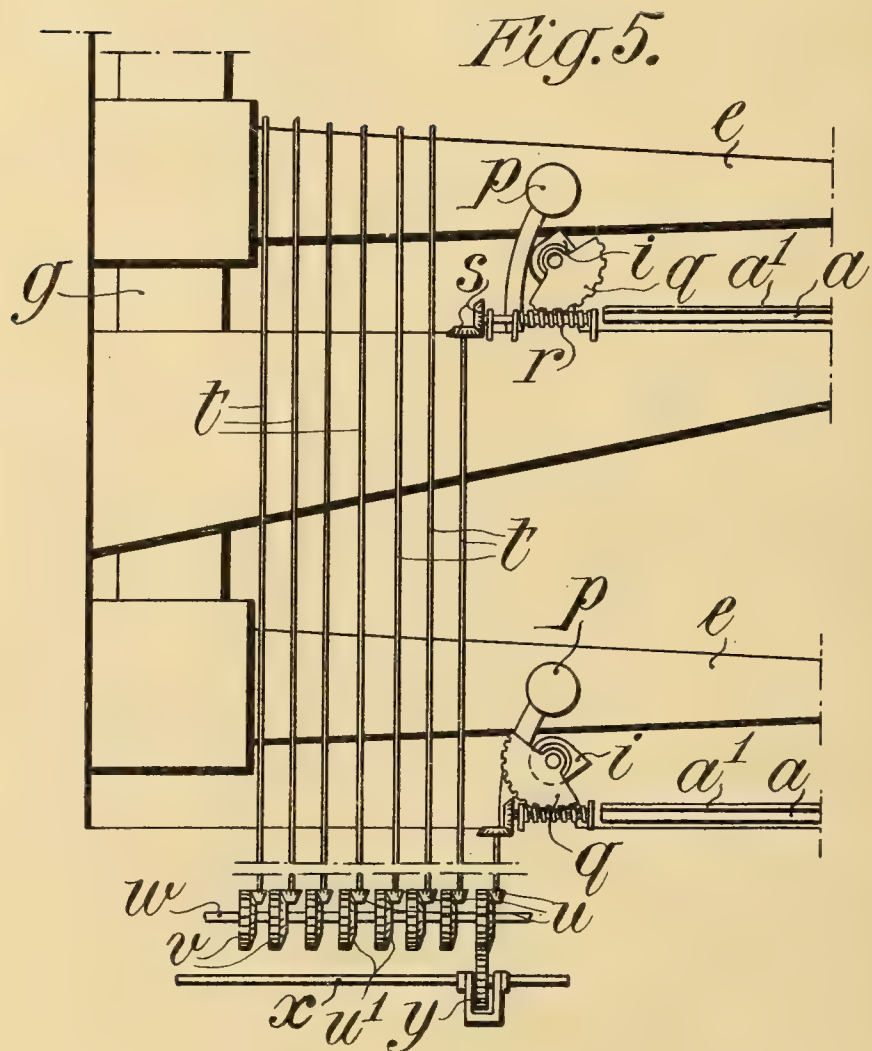
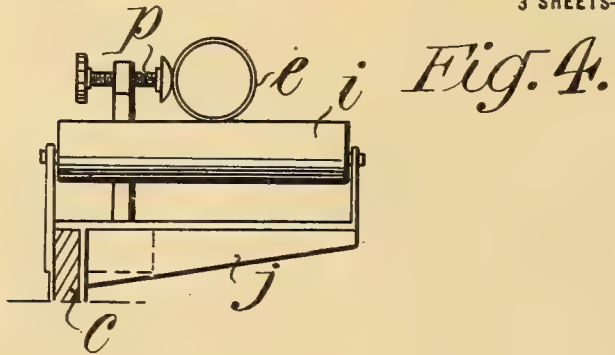
COIN FREED GRAMOPHONE.

APPLICATION FILED FEB. 18, 1915. RENEWED FEB. 19, 1918.

1,262,521.

Patented Apr. 9, 1918.

3 SHEETS—SHEET 3.



WITNESSES.

John R. May.
David R. Wagner.

INVENTOR,
James W. Knights,

BY

E. J. Siggers.
ATTY.

UNITED STATES PATENT OFFICE.

JAMES W. KNIGHTS, OF HAMMERSMITH, LONDON, ENGLAND.

COIN-FREED GRAMOPHONE.

1,262,521.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed February 18, 1915, Serial No. 9,131. Renewed February 19, 1918. Serial No. 218,173.

To all whom it may concern:

Be it known that I, JAMES WILLIAM KNIGHTS, a subject of His Majesty the King of England, residing at Hammersmith, in the county of London, Kingdom of England, have invented certain new and useful Improvements in or Relating to Coin-Freed Gramophones, of which the following is a specification.

10 This invention relates to improvements in coin-freed gramophones of the kind in which a plurality of gramophone records and tone arms are so arranged that any desired record of the plurality of records can be re-
15 produced on the operation of the coin-freed mechanism.

The present invention consists in the improved construction, arrangement and combination of parts hereinafter described and
20 more particularly pointed out in the appended claims.

I will now describe my invention with reference to the accompanying drawings in which:—

25 Figure 1 is a diagrammatic side elevation of part of one form of my improved coin-freed gramophone.

Fig. 2 is an enlarged sectional side elevation of the opposite side;

30 Fig. 3 is a part plan;

Fig. 4 is a part front sectional elevation; and

Fig. 5 is a front elevation of a modification.

35 As shown I provide a plurality of turn tables *a* on which are disposed gramophone records or disks *a'*. These tables are mounted in any convenient manner on a central spindle or shaft *b* rotatably mounted in brackets or the like *c* projecting from a suitable casing or the like *d*. Above each table or record is disposed a movable tone arm *e*, fitted with any usual sound box *f* which is adapted to rest, when lowered, on the desired record, so that sound will be transmitted therefrom to a common sound tube *g*
40 mounted on the casing *d*, and provided at its upper end with any usual amplifying means or horn *h*. These tone arms *e* are adapted to be raised and lowered by any suitable means such as cams or elliptical carriers *i* which are mounted transversely of the tone arms in brackets *j* attached to the brackets *c*. As shown in Fig. 1 these
50 cams are adapted to be separately rotated by means of bell-crank levers *k* which are oper-

ated in any well known manner by coin-freed mechanism not shown. Such mechanism could conveniently comprise a plurality of cams on a common shaft against
60 which rollers on the ends of the levers *k* might be separately brought into position. The cams *i* are also connected at their opposite ends to bell-cranks *l* which are adapted to operate baffle plates *m* in the sound tube
65 so that only the particular tone arm, that has been lowered, is put into communication with the sound tube as shown in section in Fig. 2. In order to bring the tone arms back to the commencement of the record, I may
70 provide adjustable arms *n* arranged with antifriction rollers in such a manner that on the rotation of the spindle *o*, by hand or automatically after each operation, the outer ends of the arms *n* will push the tone
75 arms to the inner part of the disk or commencement of the record. Suitable adjustable stops *p* may be provided to limit the movement of the tone arms when required such as when a short record is used. 80

In operation and when a coin is inserted in the coin-freed mechanism, the spindle *b* is rotated and also the plurality of records *a'* and at the same time one of the tone arms *e* is lowered onto the record corresponding
85 to the selected tune. This tone arm *e* may be actuated by an external index finger adapted to point on an index of the various tune selections or the like through the medium of the corresponding bell-crank lever
90 *k* and cam *i* which is rotated to the position shown in the lower part of Fig. 1. During this movement of the cam *i* the bell-crank lever *l* on the opposite side is actuated thus moving the baffle plate *m* and putting the
95 tone arm into communication with the sound tube for the reproduction of the desired record.

In a modification as shown in Fig. 5, I control the cams *i* by means of sectors *q*
100 on the cam shaft. These sectors are actuated by worms *r* through the medium of bevel wheels *s*, shafts *t* and bevel wheels *u*, on the lower ends of the said shafts *t*, which engage with bevel wheels *u'* loosely mounted
105 on a shaft *w*. On each of the bevel wheels *u'* I provide a spur wheel *v* and these spur wheels are adapted to be separately engaged by a common spur wheel *y* slidable upon a square driven shaft *x* and
110 controlled by the operator. Thus the operation of any one of the spur wheels *v*

will serve to lower its respective tone arm and put the machine into operation for playing the selected tune or piece.

Although I have shown rods and bell crank levers for transmitting the power, I might conveniently substitute Bowden wire for this purpose.

What I claim as new and desire to secure by Letters Patent in the United States is:—

10 1. A coin-freed gramophone comprising a plurality of rotatable tables to receive records, a common sound tube, a plurality of tone arms mounted on the tube, each tone arm adapted to operate on a separate record, a plurality of cams, one cam located
15 beneath each tone arm to raise and support the same, a plurality of baffle plates mounted in the sound tube for controlling communication between the sound tube and tone
20 arms, and a connection between each cam and baffle plate of the desired tone arm to open the baffle plate upon the turning down of the cam to lower the said tone arm.

2. A coin-freed gramophone comprising a
25 plurality of rotatable tables for supporting records one above the other, a vertical sound tube having a plurality of openings throughout its length, a plurality of tone arms mounted on and supported by the sound
30 tube and in communication with the sound tube, each tone arm being adapted to operate on a separate record, a plurality of cams for normally maintaining the tone arms out of contact with the records, baffle plates
35 for closing the communication between the tone arms and sound tube, each baffle plate being connected to a cam, and means for independently actuating each cam whereby upon the actuation of a cam for lowering
40 the tone arm the baffle plate of the respective tone arm will be operated for forming a communication between the tone arm and sound tube.

3. A coin-freed gramophone comprising a
45 plurality of rotatable tables on which records are mounted, a common sound tube, and tone arms normally in communication therewith, means for cutting off communication between each tone arm and the sound tube,
50 means for raising and lowering the tone arms from and to the tables, and connecting devices between the raising and lowering means and the cut-off means for causing the latter to be operated by the former.

55 4. A coin-freed gramophone comprising a plurality of horizontal rotatable tables ar-

ranged one above another and each adapted to support a record; a common sound tube; a plurality of tone arms, one for each of said records, mounted on said sound tube; 60 a plurality of devices, one for each of the tone arms, adapted to be separately operated to raise and lower their respective tone arms; a plurality of baffle plates, one for each of the tone arms, mounted within the
65 sound tube; and operative connections between said raising and lowering devices and said baffle plates.

5. A coin-freed gramophone comprising a plurality of horizontal rotatable tables ar- 70 ranged one above another and each adapted to support a record; a common sound tube; a plurality of tone arms, one for each of said records, mounted on said sound tube, and adapted to be separately brought into
75 engagement with the respective records to reproduce the same; rotatable arms to return each of said tone arms into its starting position when the reproduction of the respective record is finished; and adjustable
80 stops to limit the movement of the tone arms.

6. A device as specified comprising a common sound tube, a vertically arranged rotary spindle spaced from the tube, a plurality 85 of horizontal vertically spaced apart tables mounted on the spindle to rotate therewith and support a series of independent records, a series of tone arms projecting from said common tube into position over the respec- 90 tive records, means for normally holding all of the tone arms out of contact with the records, and means for releasing the tone arms as selected for engagement with the records. 95

7. In a device as specified, a sound tube, a plurality of rotary tables, a tone arm for each table adapted to communicate with the sound tube, supports for normally holding the tone arms out of contact with the tables 100 and out of communication with the sound tube, and means for releasing the selected tone arm to engage the table and to communicate with the sound tube.

In testimony whereof I have hereunto 105 signed this specification in the presence of two subscribing witnesses.

JAMES W. KNIGHTS.

Witnesses:

J. S. WITHERS,
FRANK BLAKEY.

TALKING MACHINE.

1,262,592 ----- M. Nystrom,
Filed June 1, 1915,
Patented Apr. 9, 1918.

1,262,592.

Patented Apr. 9, 1918.

Fig. 1.

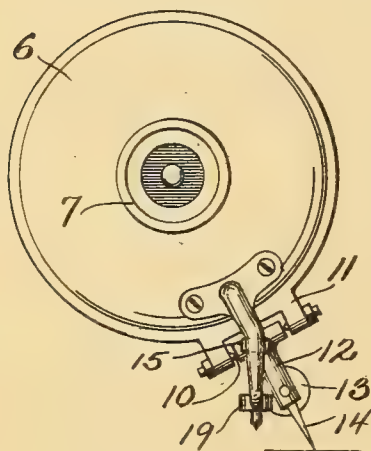


Fig. 2.

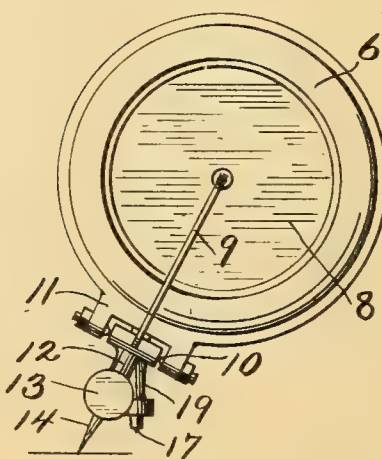


Fig. 3.

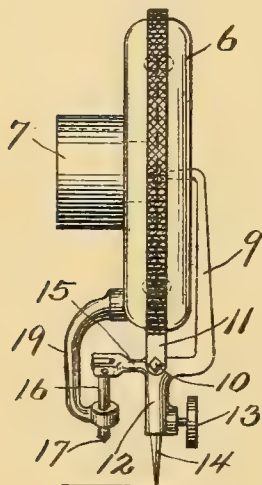
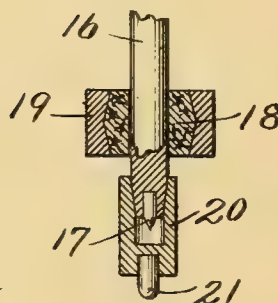


Fig. 4.



Witness:
Peter Jongedijk.

Inventor:
Martin Nystrom
By Richd J. Jaeken
Atty

UNITED STATES PATENT OFFICE.

MARTIN NYSTROM, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
CHARLES E. OSBORNE, OF CHICAGO, ILLINOIS.

TALKING-MACHINE.

1,262,592.

Specification of Letters Patent.

Patented Apr. 9, 1918.

Application filed June 1, 1915. Serial No. 31,603.

To all whom it may concern:

Be it known that I, MARTIN NYSTROM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Talking-Machines, of which the following is a specification.

My invention relates to talking machines in which a diaphragm is caused to vibrate by the tracking of a needle or point upon a record, and the objects of my improvements are first, to reproduce the recorded vibrations accurately and correctly; second, to provide a plurality of tracker devices in connection with the diaphragm to enable the use of different records, third, to enable using different kinds of records without in any way making a change in the machine; fourth, to make a simple, cheap and efficient device and other features to become apparent from the description to follow.

There are two known talking machine records on the market. One has the indentations representing the sound record arranged laterally or zig-zag from side to side with relation to the line of travel of the needle, and the other has such indentations arranged up and down or longitudinally with relation to the longitudinal axis of the tracker point; therefore it is necessary to have one kind or style of machine to play or use the one kind of record and to have another kind or style of machine to play or use the other kind of record. By the use of my invention either kind of record can be played or used on the one machine without any foreign or disturbing noises being perceptible.

My invention comprises two tracker devices one to be used on a record having the laterally arranged indentations and one to be used on a record having the shallow and deep indentations, both of said devices being properly connected to the diaphragm of the machine to vibrate the same when tracking over a record. Of course the one device has the tracker needle in proper position to vibrate the diaphragm when tracking over a record having the laterally or zig-zag arranged indentations and the other device a point in proper position to vibrate the diaphragm when tracking over a record having the shallow and deep indentations.

To describe my invention so that others versed in the art to which it pertains can

make and use the same I have illustrated it on the accompanying sheet of drawing forming a part of this specification, in which:

Figure 1, is a view of one side of a sound box having tracker devices embodying my invention connected thereto; Fig. 2, is a view of the opposite side of the same sound box; Fig. 3, is an edge view of the same showing the construction of the two tracker devices, and Fig. 4, is a detail sectional view showing the guide for the tracker point rod and also means for attaching a different point to the rod.

Similar reference characters refer to similar parts throughout the several views.

In the drawings I have not attempted to show an entire machine, but only the sound box 6, with the two tracker devices connected thereto. The sound box 6 is connected to the horn in the usual way by means of the slip or threaded joint 7. The diaphragm 8 is secured in the box in any of the well known manners and has secured to its center, one end of the vibrator arm 9 in the usual way, and said arm 9 extends radially outward beyond the limits of the box 6 where it is pivotally mounted at 10 to a suitable bracket 11 secured rigidly to the box 6. The pivot 10 is arranged in such position that the vibrator arm 9 is free to move with the center of the diaphragm when the same is vibrated.

The vibrator arm 9 has an extension 12 on the opposite side of the pivot 10 from the diaphragm, which is provided with a needle socket and a set-screw 13 to hold the tracker needle 14, which I shall designate as the lateral motion needle because it is employed in connection with a record having the zig-zag indentations which cause the needle to move laterally as it tracks over the same.

The vibrator arm 9 is provided with a second extension or arm 15 which extends at right angles to the axis of pivot 10 and at right angles to the axis of the lateral motion needle 14. The free end of arm 15 is pivotally connected to one end of the tracker rod 16 provided with the point 17 which I shall designate as the longitudinal motion point because it is employed in connection with a record having the shallow and deep indentations which give the point a longitudinal movement when it tracks over the same. The remaining end of the tracker rod 16 is guided during its slight longitudinal

dinal movement by passing through a bushing 18 made of some soft material as cork or felt, to deaden any metallic or foreign sounds, which is securely mounted in the end of a bracket 19 rigidly secured to the box 6. The point 17 is made of sapphire or other suitable stone or metal. As clearly shown in Fig. 4, the longitudinal motion tracker rod 16 may be provided with a slightly tapering lower extremity onto which may be secured a tip 20 having a correspondingly tapering hole and provided with a rounded or dull point 21. The said point 21 is employed in connection with special records whose indentations are made to operate with a rounded or dull point.

From the description given it will be understood that when a record having zig-zag indentations is used in the machine a lateral motion needle 14 is secured in the extension 12, and when a record having shallow and deep indentations is used in the machine the lateral motion needle is removed so that the longitudinal motion point 17 of the tracker rod 16 is free to contact with the surface of the record.

Obviously when the lateral motion needle 14 is employed the vibrations will be transmitted from the record through the needle 14, extension 12, vibrator arm 9 and thence to diaphragm 8; and when the longitudinal motion point 17 is employed the vibrations will be transmitted from the record through tracker rod 16, extension or arm 15, vibrator arm 9 and thence to the diaphragm 8. Thus it is clear that the vibrations will be

transmitted to the diaphragm 8 if either of the tracker devices is employed.

It will be understood that the material size and arrangement and construction of the parts may be modified without in the least departing from the scope of my invention.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a device of the class described, a diaphragm, a vibrator arm having one end connected to said diaphragm, means whereby a lateral motion tracker needle is operatively connected to said vibrator arm, means whereby a tracker rod carrying a longitudinal motion tracker point is pivotally connected at one end to an extension on the vibrator arm and means comprising a bearing provided with sound insulating material for guiding the free end of said tracker rod.

2. In a device of the class described, a tracker rod provided at one end with a tracker point and arranged to move longitudinally when vibrated, a bearing for one end of said tracker rod lined with sound insulating material, and a pivoted angular bar pivotally connected to the other end of said tracker rod.

In testimony whereof I have signed my name to this specification in presence of a subscribing witness this 25th day of January, 1915, at Chicago, Illinois.

MARTIN NYSTROM.

Witness:

RICH'D J. JACKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CABINET FOR PHONOGRAPH RECORDS.

1,262,789 ----- W. C. Heller,
Filed Feb. 24, 1917,
Patented Apr. 16, 1918.

W. C. HELLER,
CABINET FOR PHONOGRAPH RECORDS.
APPLICATION FILED FEB. 24, 1917.

1,262,789.

Patented Apr. 16, 1918.
2 SHEETS—SHEET 1.

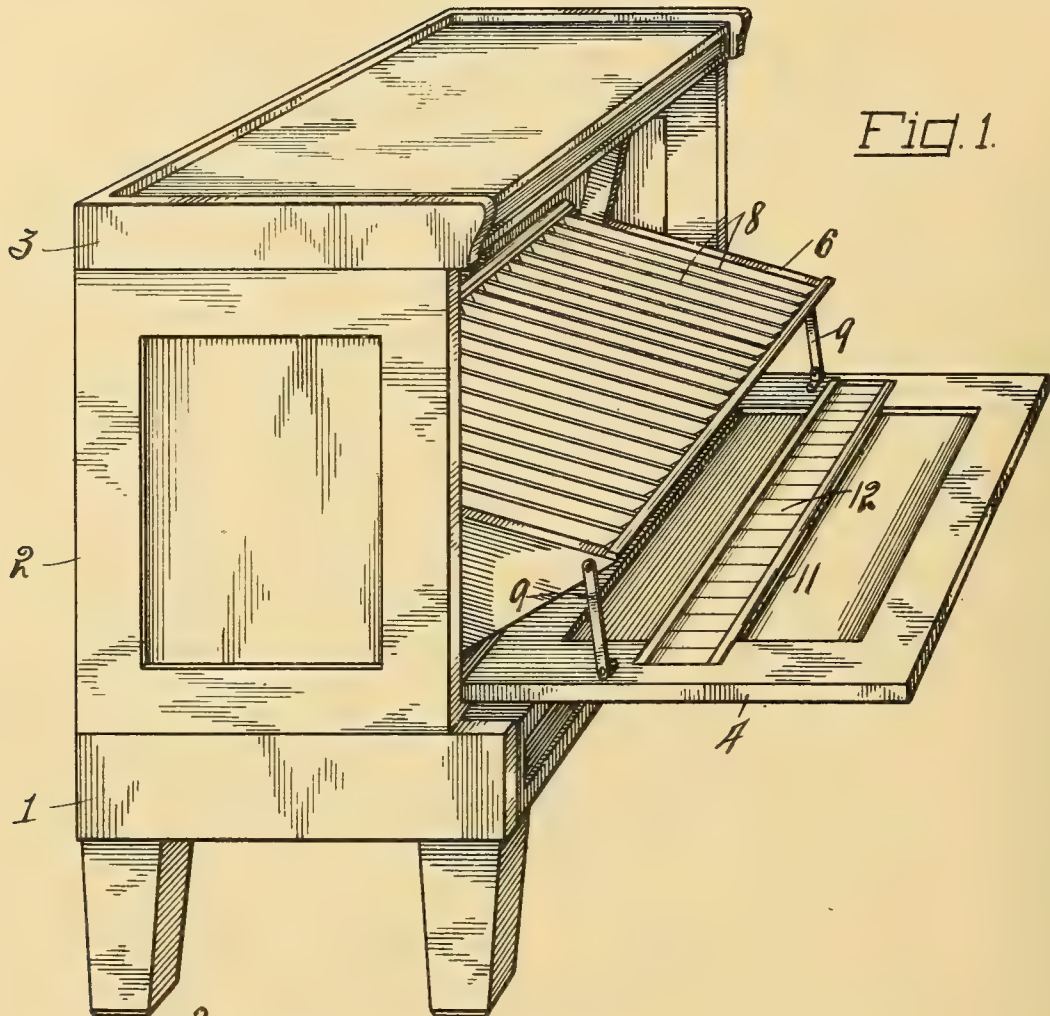


Fig. 1.

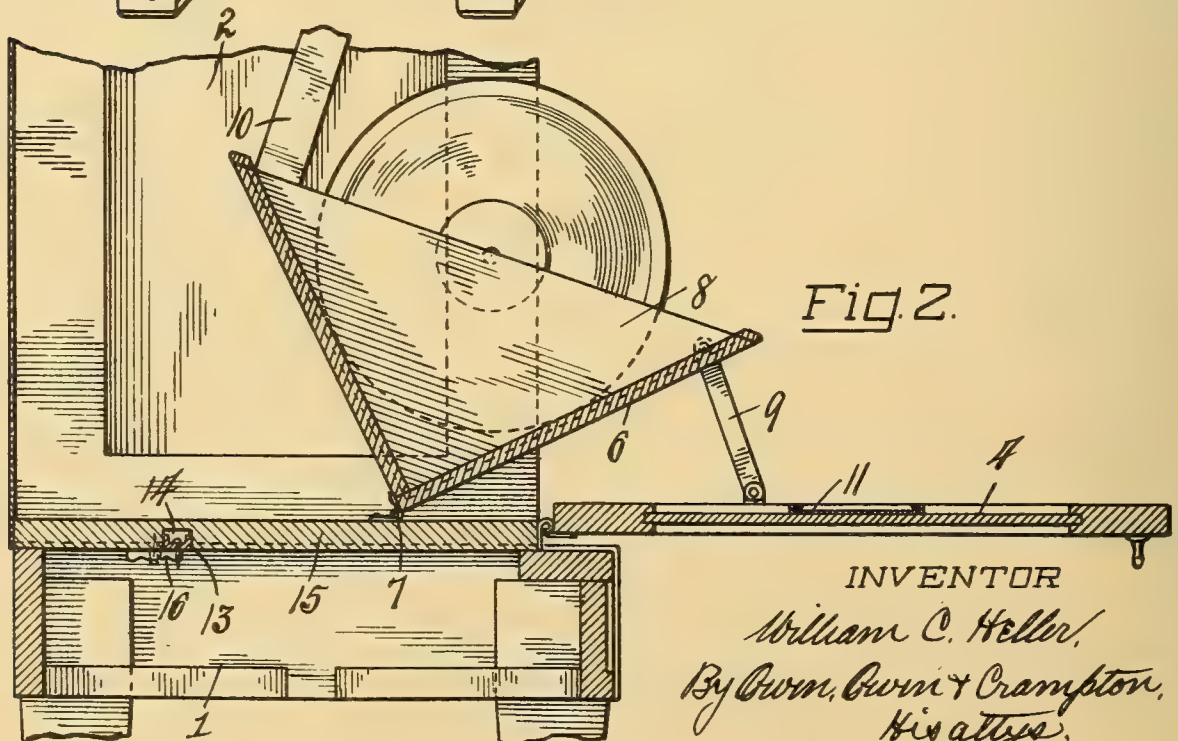


Fig. 2.

INVENTOR

William C. Heller/
By Owen, Owen & Crampton,
His attys.

W. C. HELLER.
CABINET FOR PHONOGRAPH RECORDS.
APPLICATION FILED FEB. 24, 1917.

1,262,789.

Patented Apr. 16, 1918.
2 SHEETS—SHEET 2.

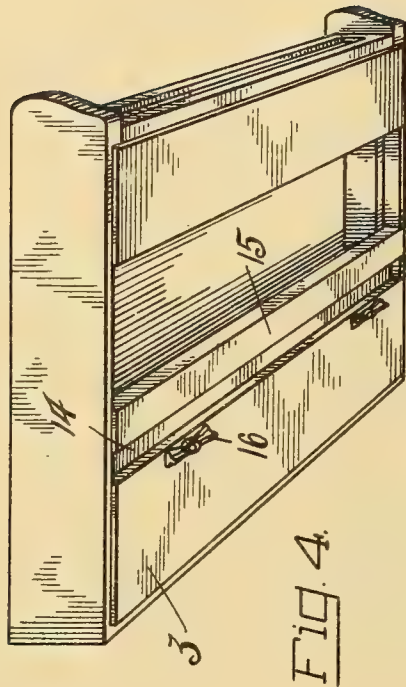


Fig. 4.

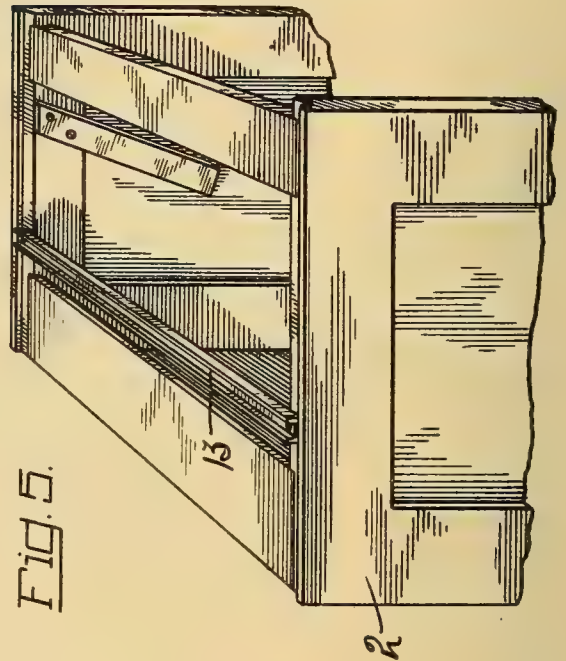


Fig. 5.

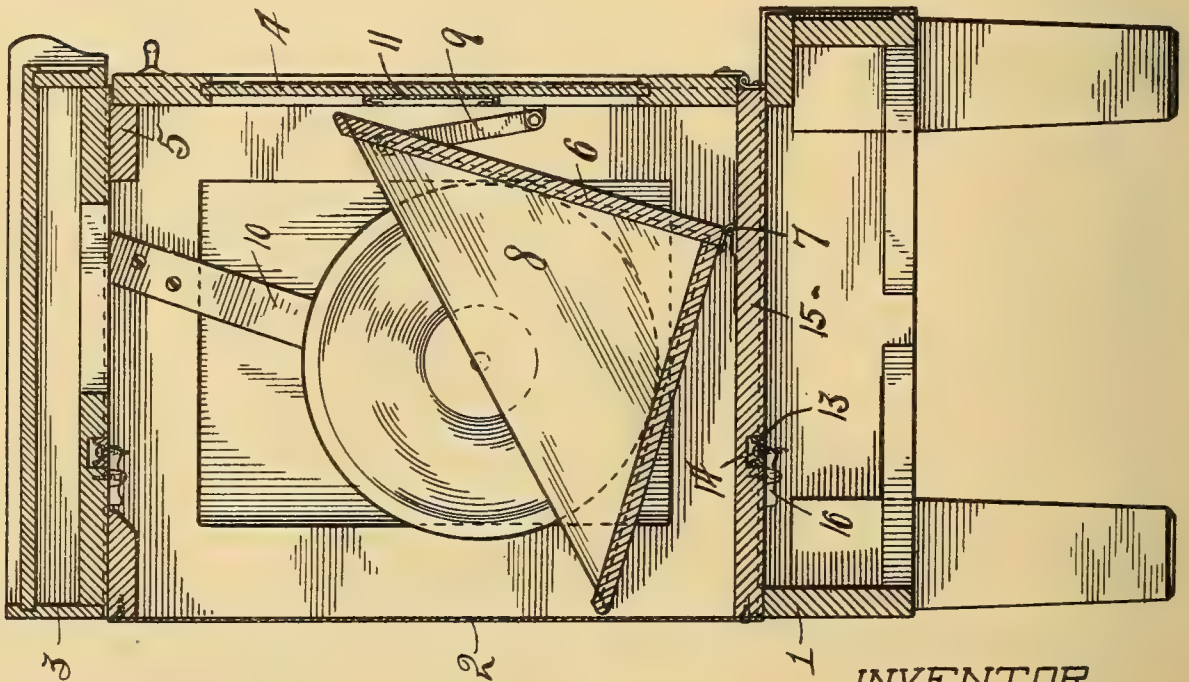


Fig. 3.

INVENTOR
William C. Heller,
By Curn, Curn & Crampton,
His attys.

UNITED STATES PATENT OFFICE.

WILLIAM C. HELLER, OF MONTPELIER, OHIO.

CABINET FOR PHONOGRAPH-RECORDS.

1,262,789.

Specification of Letters Patent. Patented Apr. 16, 1918.

Application filed February 24, 1917. Serial No. 150,640.

To all whom it may concern:

Be it known that I, WILLIAM C. HELLER, a citizen of the United States, and a resident of Montpelier, in the county of Williams and State of Ohio, have invented a certain new and useful Cabinet for Phonograph-Records; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to cabinets, and particularly to those adapted for filing phonograph records.

The object of my invention is the provision of a simple, efficient and improved cabinet of the class described, which is operable by an opening or closing of the door to move a record holding rack, contained therein, to record delivering or record storing positions, respectively. Other objects and advantages of the invention will be apparent from the following detailed description thereof.

While the invention, in its broader aspect, is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a cabinet in open position embodying my invention. Fig. 2 is an enlarged fragmentary sectional view thereof with the cabinet in open position. Fig. 3 is a vertical section of the same in closed position. Fig. 4 is a bottom perspective view of the cap section of the cabinet, and Fig. 5 is a fragmentary top perspective view of the record receiving section of the cabinet.

The cabinet embodying my invention is preferably of the sectional type, and in the illustrated embodiment comprises the base section 1, the cabinet proper or record storing section 2, and the cap section 3, built up one on top of another.

The cabinet section 2, in which the primary feature of my invention resides, has its front side open, with a door 4 hinged therein at its lower edge to adapt it to have outward and downward opening movements. The top strip 5, which is disposed adjacent to the upper front edge of the cabinet sec-

tion, acts as a stop for the closing movements of the door.

A record holding rack 6 of V-form in cross-section is mounted within the cabinet for rocking movements, being hinged at its apex to the cabinet bottom, slightly to the rear of the front edge thereof, as at 7. The space between the side walls of the rack is divided into a plurality of record receiving stalls by transverse partitions 8.

Each end of the rack 6 is connected to the respective end portion of the door, at its inner side, by a link 9, which is pivoted at one end to the rack, preferably adjacent to its upper forward edge, and at its other end to the door. The relative positions of the link-pivots are preferably such that the links stand in substantially vertical or upright positions when the door is in closed position, as shown in Fig. 3. It is thus evident that upon an opening of the door the opening or forward rocking movement of the rack is very slow at first and gradually increases to substantially that of the door, and that upon a closing of the door the speed of the rearward closing movement of the rack is gradually diminished while the movements of the door may be uniform.

This is important as a sudden opening or closing of the door will not communicate any shock to the records in the rack. When the rack is in closed position its rear side stands slightly inclined from a horizontal plane to prevent records rolling rearward out of the stalls, and a front wall of the rack also stands slightly inclined from a horizontal plane when in open position to prevent a forward rolling of records therefrom.

The center of gravity of the rack and records contained therein is at the rear of the rocking axis of the rack when the door is near its closed position, thereby exerting a closing effort on the door, which is an important feature. The opening movement of the door and rack is limited by the rear end portions of the rack ends striking stops 10 on the cabinet ends. The cabinet is substantially air-tight to provide an air cushion for the door when closing to prevent a slamming action. The door 4, when in open position, forms a shelf in advance of the rack on which records or other articles may be placed, and is provided on its top side lengthwise of the rack with a frame or plate for receiving or holding a card 12 having divisions therein in register with and

corresponding to the rack divisions. The names of records in the different rack stalls may be entered on the corresponding divisions of the record. Each section of the cabinet is provided on its top with a bar 13, which extends lengthwise thereof and is fixed at its ends to the section ends, such bar being preferably of metal. This bar is intended to fit up into a registering recess 14 provided longitudinally in the under side of the bottom 15 of the next superimposed section, but is not extended entirely through said bottom, thus preventing relative backward and forward movements of the two sections. One or more buttons 16 of elongated form are pivoted to the section bottom at a side of the recess 14 and adapted to be turned to engage under a bar when in such recess and retain it therein, as is apparent. This provides a simple interlocking means for the sections and at the same time enables the top side of the bottom 15 to be perfectly smooth.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A cabinet having its front side open, a door for closing said opening and hinged at its lower edge therein, an article holding rack V-form in cross-section pivoted at its apex within said cabinet for forward and backward rocking movements, and means connecting said rack and door for imparting predetermined rocking movements to the rack when the door is opened and closed.

2. A cabinet having its front side open,

a door for closing said opening and hinged at its lower edge therein, an article holding rack V-form in cross-section pivoted at its apex within said cabinet for forward and backward rocking movements, and means connecting said rack and door for imparting predetermined rocking movements to the rack when the door is opened and closed, the closing movement of the rack being gradually lessened in speed relative to the closing movement of the door.

3. A cabinet having its front side open, a door for closing said opening and hinged at its lower edge therein, an article holding rack pivoted within said cabinet and having its side walls disposed in diverging relation, means connecting said rack and door for communicating forward rocking movements to the rack when the door is opened, and vice versa, the center of gravity of the rack when in closed position being at the rear of its pivot and when in open position being at the front of the rack.

4. A cabinet having its front side open, a door for closing said opening and hinged at its lower edge therein, a rack V-form in cross-section pivoted at its apex within said cabinet for forward and backward rocking movements and having article receiving stalls, connection between said rack and door for swinging the rack forward to record delivering position when the door is opened, and vice versa, the center of gravity of the rack being disposed at the rear of its pivot when in closed position and the front and rear sides of the rack standing in inclined position when the rack is respectively in open and closed positions.

In testimony whereof, I have hereunto signed my name to this specification.

WILLIAM C. HELLER.

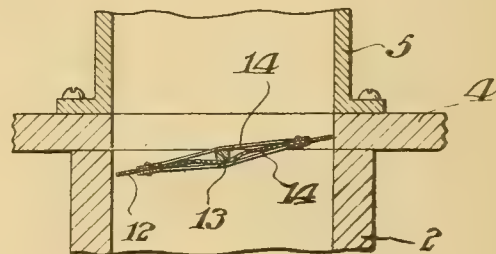
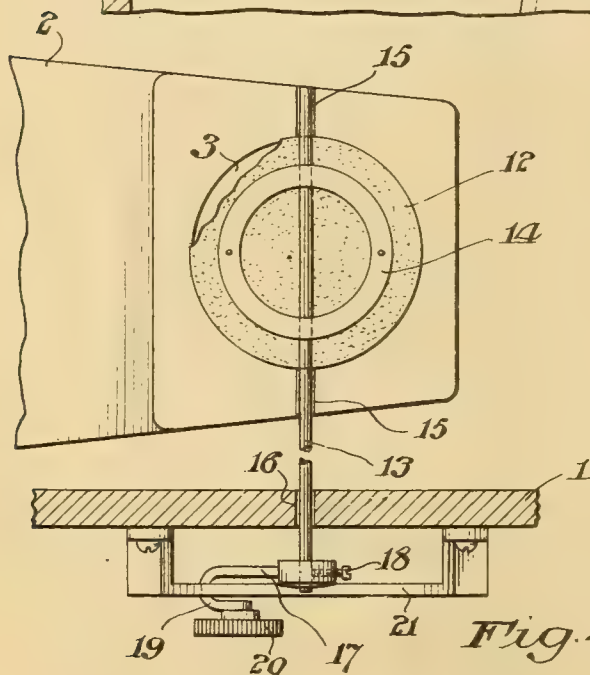
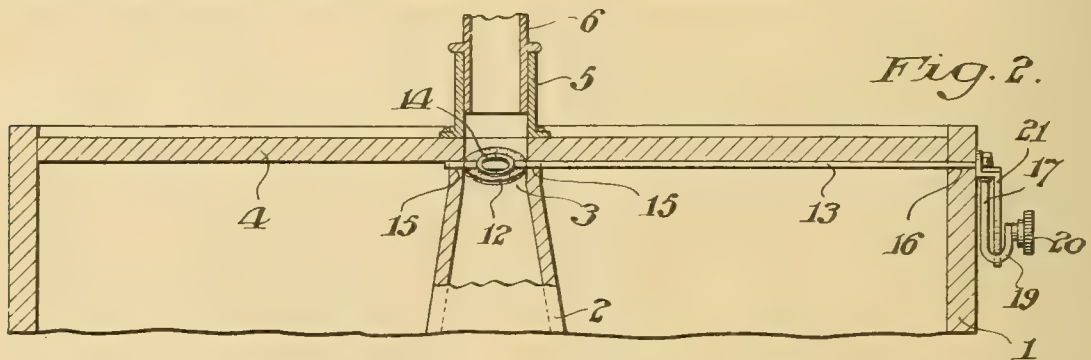
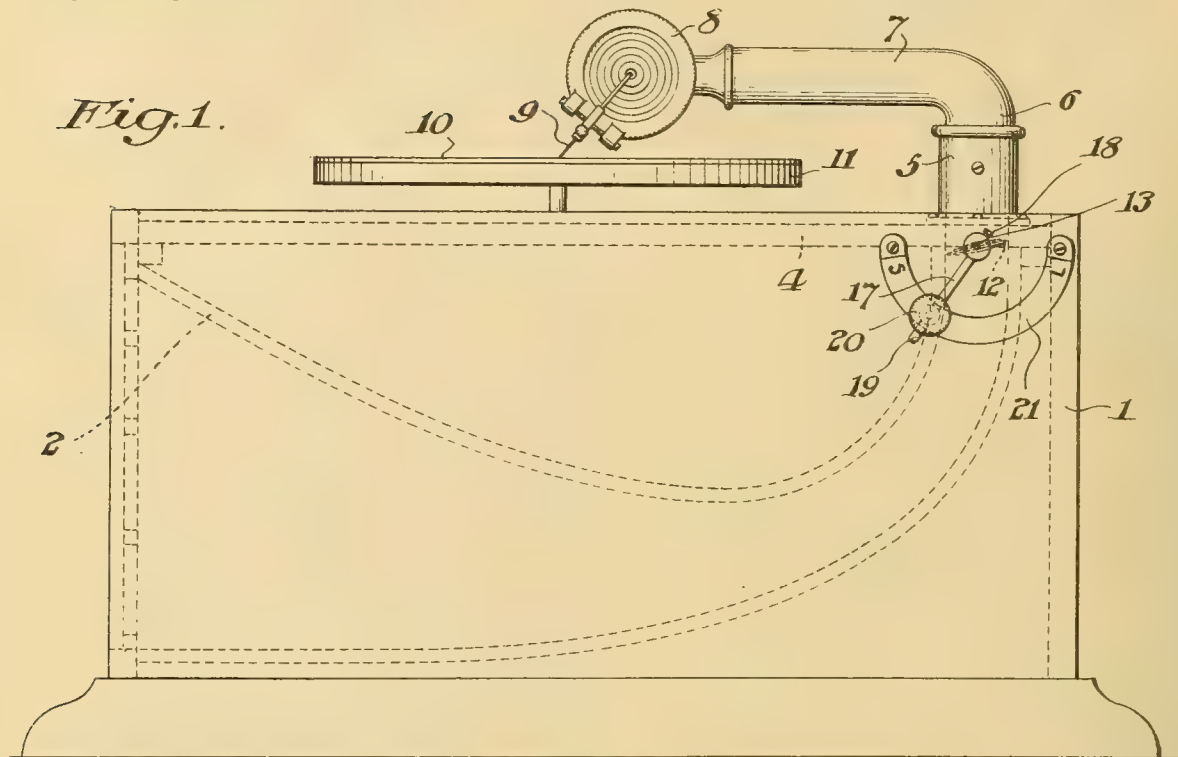
TALKING MACHINES.

1,262,810 ----- T. Kraemer,
Filed July 26, 1917,
Patented April 16, 1918.

T. KRAEMER.
TALKING MACHINE.
APPLICATION FILED JULY 26, 1917.

1,262,810.

Patented Apr. 16, 1918.



Inventor:
Thomas Kraemer.

By Chas. N. Butler
Attorney.

UNITED STATES PATENT OFFICE.

THOMAS KRAEMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO DOMESTIC TALKING MACHINE CORPORATION, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

TALKING-MACHINE.

1,262,810.

Specification of Letters Patent.

Patented Apr. 16, 1918.

Application filed July 26, 1917. Serial No. 182,818.

To all whom it may concern:

Be it known that I, THOMAS KRAEMER, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain Improvements in Talking-Machines, of which the following is a specification.

This invention relates more particularly to means for modifying the sounds produced by a talking machine, and its primary object is to provide an improved expression device adapted for convenient manual operation to effect individual interpretations of musical or spoken compositions.

The characteristic features of my improvements are more fully disclosed in the following description and the accompanying drawings in illustration thereof.

In the drawings, Figure 1 is a side elevation of a talking machine embodying my improvements; Fig. 2 is a broken sectional view taken vertically through the mouth of the amplifier illustrating improvements of my invention in side elevation; Fig. 3 is an enlarged broken sectional view taken on a vertical plane through the mouth of the amplifier and the valve therein, transversely to the view shown in Fig. 2; and Fig. 4 is a broken sectional plan view taken on a horizontal plane coinciding with the bottom of the deck of the talking machine.

The talking machine illustrated in the drawings comprises the case or cabinet 1 containing an amplifier 2 having its mouth 3 in communication, through the deck 4, with the socket 5, which is fixed to the deck and has the elbow 6 of the tone arm 7 journaled therein, the tone arm carrying the usual sound box 8 with its needle 9 which coacts with the record 10 carried on the turn-table 11, all of usual construction.

In accordance with my invention, a valve 12, preferably of such pliable and non-resonant material as leather or felt, is fixed on a shaft 13 within the mouth 3, the rings 14 being fixed to the valve proper on either side thereof to hold it in properly expanded position and clamp it on the shaft 13.

The shaft 13 is journaled on opposite

sides of the valve in the bearings 15, which are formed in the top of the amplifier 2, and in the bearing 16, which is formed in a wall of the cabinet, the removable deck 4 holding the shaft in its otherwise open bearings 15. A handle 17 is fixed on the outer end of the shaft adjacent to the cabinet by a set screw 18 and has a loop 19 on which is mounted a button 20, the loop embracing a guiding arc 21 fixed to the cabinet and providing a steady rest for the hand of the operator.

In playing a record, the performer is enabled to modify the tones at will by moving the handle and changing the position of the valve in the mouth of the amplifier, opening the sound conduit fully to obtain loud and full tones, closing the conduit to obtain low and soft tones, and adjusting the opening intermediately at will to obtain the desired expression and interpretation of the composition being reproduced.

The device is readily applied or detached, by the movable connections between the shaft and the valve and handle thereon, and by the relation of the shaft and valve to the deck of the machine.

Having described my invention, I claim:

1. In a talking machine, the combination with a cabinet having a deck and a sound conduit having an amplifier in said cabinet beneath said deck, of a shaft journaled in said cabinet and on said amplifier, said shaft being held in position by said deck, and a valve having means for clamping it adjustably on said shaft.

2. In a talking machine, the combination with a cabinet having a deck and a sound conduit having an amplifier in said cabinet beneath said deck, of a shaft journaled in said cabinet and on said amplifier, said shaft being held in position by said deck, a valve fixed on said shaft substantially in the mouth of said amplifier, and a handle for turning said shaft and adjusting the position of said valve to effect a modification of sounds transmitted through said conduit.

In testimony whereof I have hereunto set my name this 25 day of July, 1917.

THOMAS KRAEMER.

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RECORD REST.

1,263,136 ----- G. E. Smith,
Filed Mar. 27, 1917,
Patented Apr. 16, 1918.

G. E. SMITH,
RECORD REST.

APPLICATION FILED MAR. 27, 1917.

Patented Apr. 16, 1918.

2 SHEETS—SHEET 1.

1,263,136.

Fig. 1.

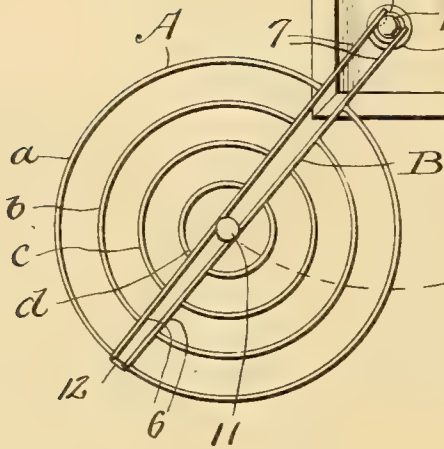
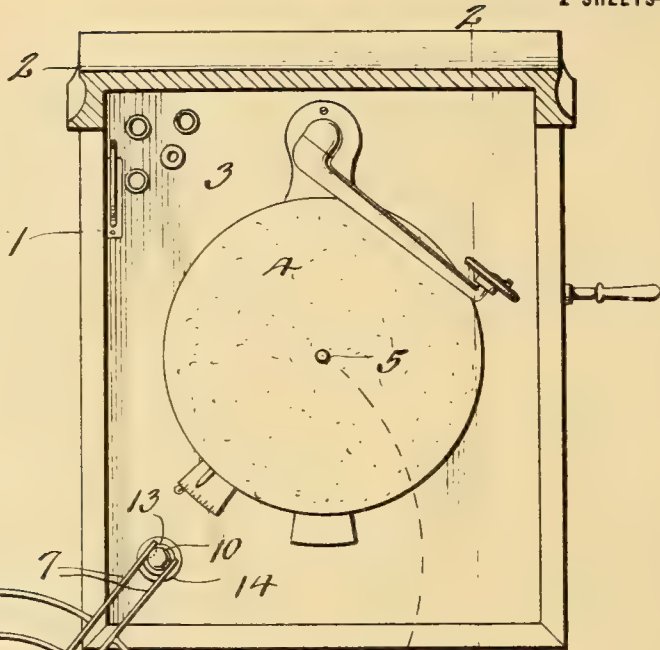


Fig. 2

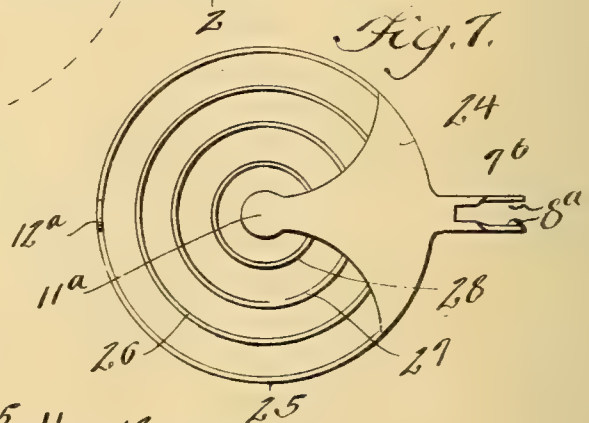
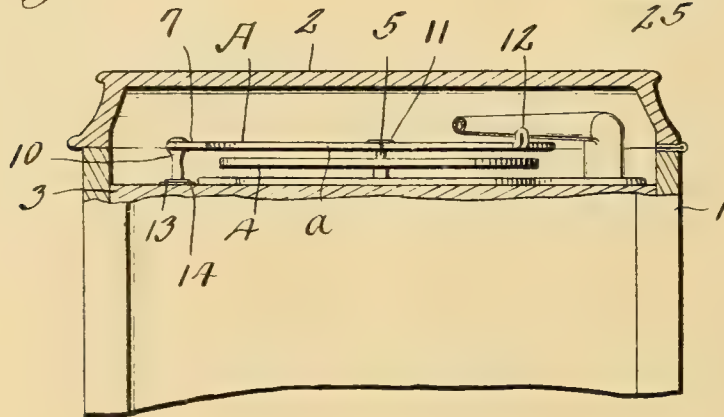


Fig. 7.



WITNESSES

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R. M. Smith

INVENTOR

G. E. Smith,

BY

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ATTORNEY

1,263,136.

G. E. SMITH.
RECORD REST.
APPLICATION FILED MAR. 27, 1917.

Patented Apr. 16, 1918.
2 SHEETS—SHEET 2.

Fig. 3.

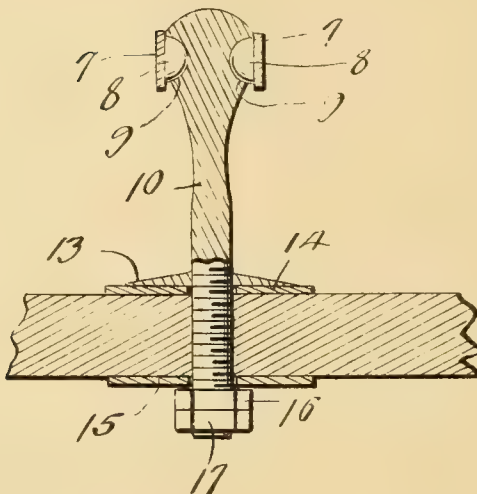


Fig. 4.

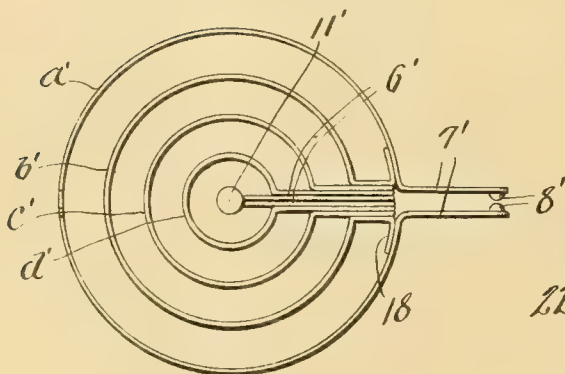


Fig. 5.

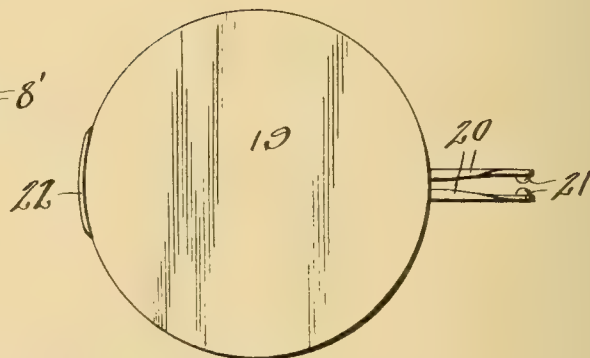
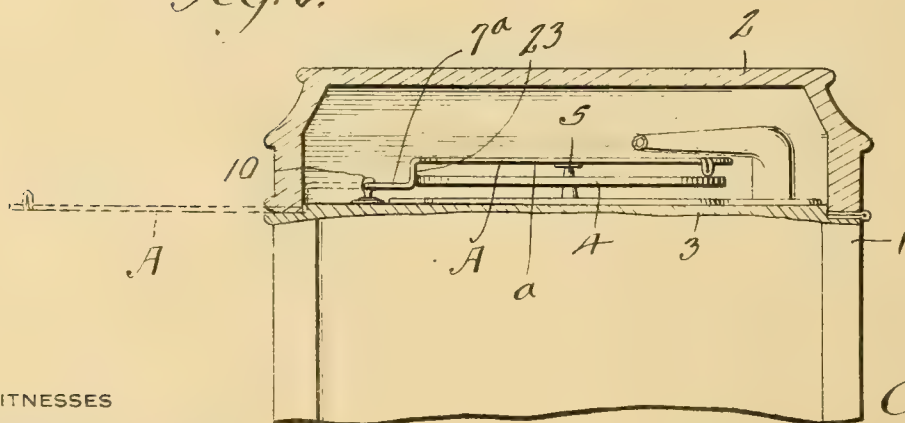


Fig. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

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RECORD-REST.

1,263,136.

Specification of Letters Patent. Patented Apr. 16, 1918.

Application filed March 27, 1917. Serial No. 157,764.

To all whom it may concern:

Be it known that I, GUY EVERT SMITH, a citizen of the United States, residing at Oklahoma city, in the county of Oklahoma and State of Oklahoma, have invented new and useful Improvements in Record-Rests, of which the following is a specification.

This invention relates to record rests for musical instruments of the type known as grafonolas, victrolas, playerphones and the like, the object of the invention being to provide in connection with such a musical instrument, a rest on which any desired number of records may be placed and supported before or after the playing of the records, thus avoiding the necessity of stooping repeatedly to remove records from the base of the usual cabinet and to replace the same.

A further object of the invention is to provide a rest for the purpose stated which is so mounted in relation to the cabinet that it may be moved to and from its useful position and housed within the cover or top of the cabinet directly over the usual record plate which carries the record while it is being played, said record support or rest not interfering with the revolving record plate while the motor, for example is running down; that is to say the record rest does not interfere at all with the rotation of the record plate which is actuated by the usual motor.

Another object of the invention is to provide an adjustable or shiftable record rest and supporting means therefor such as to enable the record rest to be swung inwardly and outwardly in relation to the cabinet and also to be tilted or moved on a horizontal axis to facilitate the swinging of the record rest to and from its housed position; also to render said record rest easily detachable and attachable, enabling the same to be entirely removed from the cabinet, should occasion require.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement of parts, herein described, illustrated and claimed.

In the accompanying drawings:—

Figure 1 is a top plan view of a reproducing cabinet, showing the record rest in its operative position and indicating by dotted lines the path of movement of said record rest as it is shifted from its useful to its housed position and vice versa.

Fig. 2 is a fragmentary section on the line

2—2 of Fig. 1, showing the record rest in its housed position and the top of the cabinet closed.

Fig. 3 is an enlarged fragmentary section, showing the supporting post and the relation thereof to the motor board.

Fig. 4 is a plan view showing a record rest of modified construction.

Fig. 5 illustrates another modification of the construction of the body of the record rest.

Fig. 6 illustrates in vertical section a modification of the supporting arm of the record rest to adapt the same to a certain style of cabinet.

Fig. 7 is a plan view of a modified form of record rest.

Referring to the drawings 1 designates a cabinet of conventional construction having the usual hinged top or cover 2 and the motor supporting board or table 3 above which is mounted the usual rotary record plate 4 mounted upon and driven by the motor located under the board 3, the arrangement thus far described being that commonly employed in the construction of cabinets of the character referred to.

In carrying out the present invention, I provide a record rest A which, in the form illustrated in Fig. 1, comprises a series of concentric rings *a*, *b*, *c* and *d* which intersect and are fastened to a diametrically extending stem or arm B which may conveniently be formed of a suitable length of rod or wire bent upon itself to form arms 6 which are in spaced relation to each other and the extremities of which project beyond the largest ring *a*, forming arms 7 provided on their inner sides with bearing lugs 8 substantially hemispherical in shape and adapted to engage and enter bearing sockets 9 in a turn post 10 secured to the motor board 3 as shown in Fig. 3. The recurved portion of the stem B is extended beyond the outer ring *a* and bent upwardly to provide a finger hold 12 and also a guard for preventing the records from sliding off the rest A. Centrally of the rest A, there is arranged a fixed disk-shaped supporting plate 11 which, when the record rest is in its housed position, is located directly over and rests upon the pin or shaft 5. This prevents the record rest from interfering with the rotation of the record plate 4 as the latter continues to be driven by the motor. The arms 6 of the stem B are free for movement toward and

away from each other as the rings *a*, *b*, *c* and *d* are split as shown and their extremities are fixedly secured to said arms 6 by welding or in any other way. Therefore said rings act as springs which act on the arms 6 to yieldingly hold the bearing lugs 8 in the sockets 9 of the supporting post 10.

The post 10 is formed with an annular shoulder or flange 13 which rests upon a thin washer 14 on the upper surface of the board 3. Another thin washer 15 is placed on the post 10 beneath the board 3 and held in place by a nut 16 which is in turn held from working loose by a lock nut 17.

From the foregoing description taken in connection with the accompanying drawings it will now be understood that the record rest A has a detachable connection with the post 10. It is attached to and detached from the post 10 by springing the arms 6 apart so as to enable the bearing lugs 8 to be moved into and out of engagement with the sockets 9 in the supporting post 10. The post 10 is midway between the pin or shaft 5 and the center of the record rest A so that when the latter is swung inwardly and over the post 10 as a center, it may be brought to lie directly over the record plate 4 with the disk 11 resting upon the upper extremity of the pin or shaft 5. The lugs 8 and the sockets 9 also permit the outer end of the record rest to be elevated by grasping the finger hold 12. This greatly facilitates the shifting of the record rest to and from its housed position. When the record rest A is in its housed position, the top of the cabinet may be closed and when the record rest is in its record supporting position, the top of the cabinet may be nearly closed, sufficiently to muffle the sounds emitted by the reproducing apparatus.

Instead of forming the record rest in the manner hereinabove described, the construction illustrated in Fig. 4 may be utilized. In Fig. 4 the central disk 11' is carried by the inner end of a pair of spring arms 6' of a length approximately equal to the radius of the record rest. The concentric rings *b'*, *c'* and *d'* have their terminal portions extended along side of the arms 6' and brazed or otherwise permanently and fixedly secured thereto. The outside or largest ring *a'* is united to the outturned extremities 18 of the terminal portions of one of the smaller concentric rings and the terminal portions of the rings *a'* are then extended outwardly from the record rest to provide spring arms 7' having at their extremities the inwardly projecting bearing lugs 8'. The record rest illustrated in Fig. 4 is connected to and disconnected from the post 10 in the same manner previously described and is capable of being operated in the same manner and for the same purpose.

If desired the body of the record rest may

be composed of a disk-shaped plate 19 of metal and arms 20 may be extended therefrom corresponding with the arm 7 of Fig. 1 and having at their extremities the inwardly facing bearing lugs 21; the plate 19 may be provided with an arcuate upturned rim or flange 22 serving as a guard to prevent the records from sliding off the record rest. The record rest illustrated in Fig. 5 is connected to and disconnected from the post 10 in the same manner and is capable of the same operation as described in connection with Fig. 1.

Where the top of the cabinet has a rabbeted fitting upon the body of the cabinet, the spring arms 7^a corresponding with the arms 7 of Fig. 1 may be formed with offsets 23 to provide clearance for the edge of the cover or top of the cabinet when said top or cover is lowered or nearly closed while the record rest is in its record supporting position.

Under either of the forms hereinabove described, when the record rest is in its housed position, the top of the cabinet may be completely closed and locked as said record rest will not interfere in any way therewith. When the record rest is in its record supporting position, any desired number of records may be placed thereon for convenient access, thus avoiding the necessity of frequently stooping to replace the records in the bottom of the cabinet. The record rest may be quickly attached to and detached from the instrument, by reason of the spring action of the arms 7. The record rest illustrated in Fig. 7 comprises a sector shaped plate 24 to which the concentric rings 25, 26, 27 and 28 are secured. The plate 24 is provided centrally of the record rest with a small disk-shaped portion 11^a corresponding in function with the part 11 of Fig. 1. The outer ring is provided with an upstanding finger-piece and record guard 12^a corresponding with the guard 12 of Fig. 1. The plate 24 is provided with the substantially parallel arms 7^b and said arms are provided upon their inner sides with projections 8^a, said parts corresponding with the parts 7 and 8 of Figs. 1 and 3. The arms 7^b are given a quarter twist to provide sufficient surface at the outer extremities thereof for the knobs or projections 8^a, the same as in Fig. 5.

I claim:—

1. The combination with a cabinet of the class described, of a supporting post rising from and secured to the motor board, and a record rest having a jointed connection with said post and adapted to be swung first upwardly and then laterally to a housed position within the cabinet and to a projecting position outside of the cabinet.

2. The combination with a cabinet of the class described, of a supporting post rising from and secured to the motor board, and

a record rest having a jointed connection with said post adapting it to be swung on a substantially horizontal axis to a housed position within the cabinet and to a projecting position outside of the cabinet, said record rest embodying relatively yieldable arms having terminal bearing members engaging said supporting post.

3. The combination with a cabinet of the class described, of a supporting post rising from and secured to the motor board, and a record rest having a jointed connection with said post adapting it to be swung on a substantially horizontal axis to a housed position within the cabinet and to a projecting position outside of the cabinet, said record rest embodying relatively yieldable arms having terminal bearing members engaging

said supporting post, the post being formed with bearing sockets into and out of which said bearing members may be sprung. 20

4. The combination with a cabinet of the class described, of a supporting post rising from and secured to the motor board, and a record rest having a jointed connection with said post adapting it to be swung on a substantially horizontal axis to a housed position within the cabinet and to a projecting position outside of the cabinet, said record rest embodying a central bearing plate which rests upon and is supported by the pin or shaft of the rotary record plate, when the record rest is in its housed position. 25 30

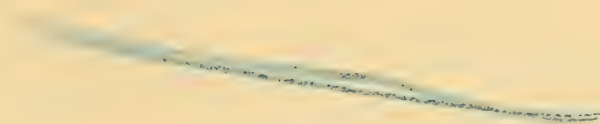
In testimony whereof I affix my signature. 35
GUY EVERT SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



NEEDLE TRIMMER FOR TALKING MACHINES.

1,263,178 ----- F. O. Wilking,
Filed Oct. 22, 1917,
Patented Apr. 16, 1918.



1,263,178.

Patented Apr. 16, 1918.

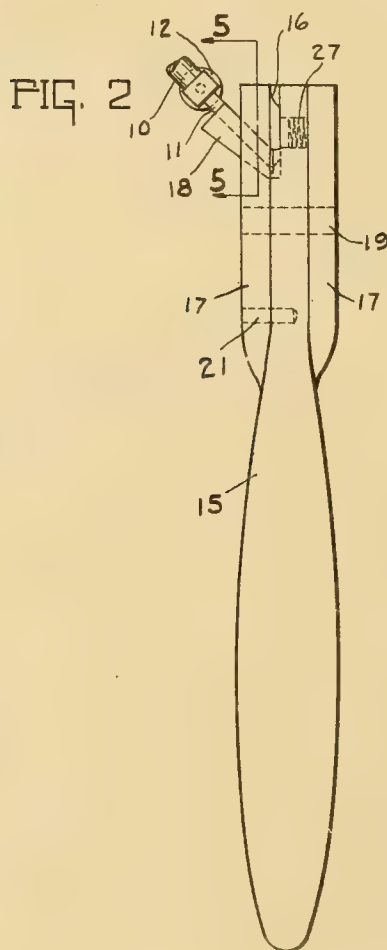
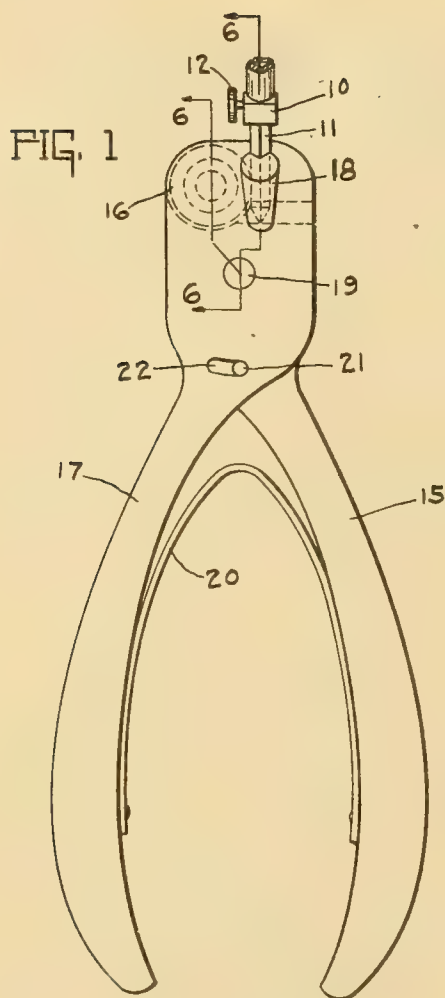


FIG. 4

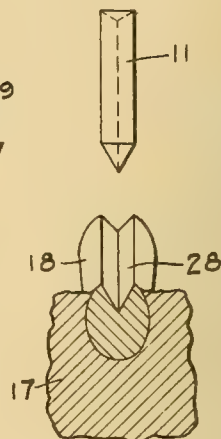


FIG. 5

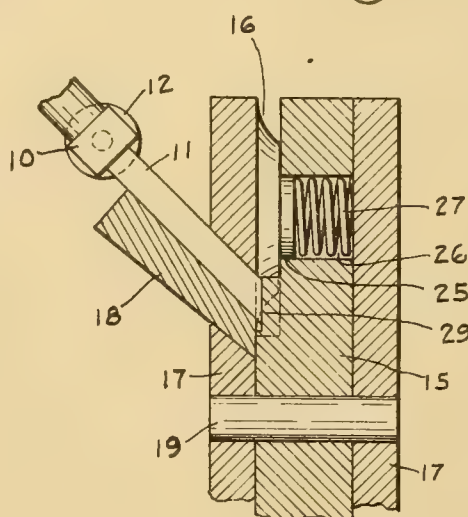
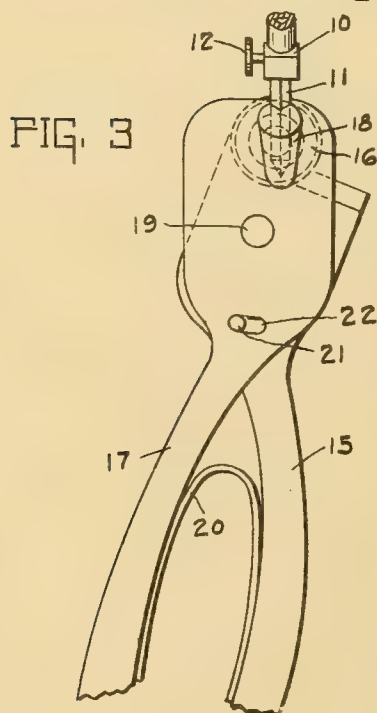


FIG. 6

INVENTOR
FRANK O. WILKING.

BY
Lockwood & Lockwood.
ATTORNEYS

UNITED STATES PATENT OFFICE.

FRANK O. WILKING, OF INDIANAPOLIS, INDIANA.

NEEDLE-TRIMMER FOR TALKING-MACHINES.

1,263,178.

Specification of Letters Patent.

Patented Apr. 16, 1918.

Application filed October 22, 1917. Serial No. 197,850.

To all whom it may concern:

Be it known that I, FRANK O. WILKING, a citizen of the United States, and a resident of Indianapolis, county of Marion and State of Indiana, have invented a certain new and useful Needle-Trimmer for Talking-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like letters refer to like parts.

The object of this invention is to trim the wooden needles in talking machines more satisfactorily than has been done heretofore; that is, to enable the needle to be cut or shaved thinner so as to get about double the number of cuttings as compared with devices heretofore in use, and to trim the needle without removing it from the sound box on which it is mounted, and to self sharpen the cutter or trimmer.

A feature of this invention is in making a cutter formed like a pair of shears, that is two members pivoted together, with the sides of their heads in slidable engagement with each other as the device is operated. One member carries a rigid guide or holder for the needle while the other member carries a stop for the needle and a circular cutter which gives to the needle a shearing cut. This circular cutter is spring pressed against the face of the member carrying the needle guide or holder so that it will make a fine shaving cut and also will be self sharpening.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings, Figure 1 is a side elevation of the needle trimmer with the needle and needle holder of the sound box in place, the device being shown in condition for operation. Fig. 2 is an edge view of what is shown in Fig. 1. Fig. 3 is the same as Fig. 1 with the parts in operated position, the lower part being broken away. Fig. 4 is a perspective view of the needle. Fig. 5 is a section through a part of the device on the line 5—5 showing a needle guide in its position as it is being placed on the needle for trimming the latter. Fig. 6 is a section on the lines 6—6 of Fig. 1, the left hand member being shown on the right hand section line in Fig. 6, and the right hand member being shown on the left hand section

member in Fig. 6, that is, with the two members in position before they are actuated, the lower part of the device being broken away.

The sound box of the talking machine is not herein shown, but the needle holder 10 of the sound box is shown. That holder is tubular to receive the wooden needle 11 which is secured in place by a set screw 12. This structure and the needle are of common type heretofore in use.

The needle trimmer is formed of a member 15 which carries a cutter 16 and a member 17 which carries a needle guide or holder 18, said two members 16 and 17 being shaped like scissors or nippers with their heads overlapping so that the sides of them abut and slide against each other and they are fulcrumed on a pin 19. The handles are normally spread apart by a spring 20, the spreading movement thereof being limited by a pin 21 in the member 17 which projects through the slot 22 in the member 15. The limit of said pin 21 when the device is not being used, is shown in Fig. 1, while the limit during use is shown in Fig. 3.

The cutter 16 is a disk with a sharp circular cutting edge at one side face of the disk, which side face and cutting edge bear tightly against the inner side face of the head of the member 17 which carries the needle guide or holder. The cutter 16 has a hub 25 which is mounted rotatably in a circular recess 26 in the member 15 and there is a spiral spring 27 in said recess which always forces the cutter outward against the other member 17 of the trimmer.

The needle guide 18 is secured rigidly in the head of the member 17 at an inclination, as shown in Fig. 6, and it has in its periphery a longitudinal needle groove 28, angular transversely so as to fit on or across the needle and to present the end of the needle to the cutter 16 at the proper angle with reference to said cutter to cause the end of the needle to receive, when trimmed, the proper bevel, substantially as shown. A stop shoulder 29 is located in the head of the member 15 opposite the inner end of the needle groove 28 to limit the position of the inner end of the needle when the trimming tool is placed in connection with the needle, or when the needle is placed in the trimming tool. This stop shoulder 29 is spaced far enough away from the inner face of the member 17 so as to determine approximately the width of the shaving that

will be cut off from the end of the needle. And said shoulder 29 is immediately in advance of the cutting edge of the cutter 16 so that as the device is operated, the shoulder 29 will leave the inner end of the needle as the knife cuts into the needle.

The device may be operated in two manners. If desired, the needle may be independent of the sound box and be laid in the groove 28 and held by the fingers in place while the device is operated. But here the needle is trimmed in another manner, by applying the trimmer to the needle while it is still secured to the sound box. This makes it needless to remove the needle from the sound box for trimming. In this latter manner the sound box is thrown up in idle position, as is well understood, and that exposes the needle and makes it easy to apply the tool thereto. The tool is applied by holding it in one hand and placing the guide 18 against the underside of the needle. When that happens, the stop shoulder 29 abuts against the end of the needle. The trimmer is then held in such relation to the needle while it is operated and it is operated by moving the two handles of the device toward each other. That moves the cutter 16 across the inner face of the member 17 and into cutting engagement with the inner end of the needle and as the cutter advances, the stop shoulder 29, of course, moves away from the needle as the cutter and stop shoulder are secured to the same member 15. The cutter is so mounted with relation to the needle guide 18 that the edge thereof below a transverse radius would engage the needle, which will automatically turn somewhat or roll and give to the needle the shearing cut desired. A very fine shaving cut can be given because the spring 27 presses the cutting edge of the cutter tightly against the inner face of the member 17 and such inner face of the member 17 sharpens such cutting edge so that it will continue to lie flatly against such inner face of the member 17. This and the automatic turning of the cutter enables it to make a very thin shaving so that by this device the needle can be trimmed about twice as many times as with devices heretofore known, which doubles the length of the life or use of a needle.

The invention claimed is:

1. A trimmer for talking machine needles including two members fulcrumed together shear-like, a needle guide secured in the head of one of said members and having a groove to receive a needle and with its inner end flush with the inner face of the head of said member, and a circular cutter rotatably mounted in the head of the other member in position for its cutting edge to engage the inner end of the needle in the needle holder and trim the same.

2. A trimmer for talking machine needles

including two members fulcrumed together shear-like, a needle guide secured in the head of one of said members and having a groove to receive a needle and with its inner end flush with the inner face of the head of said member, and a circular cutter rotatably mounted in the other member in position for its cutting edge at a point away from the plane of movement of the axis of said cutter when the device is operated to engage the inner end of the needle so that as the device is operated the cutter will turn and trim the inner end of the needle.

3. A trimmer for talking machine needles including two members fulcrumed together shear-like, a needle guide secured in the head of one of said members and having a groove to receive a needle and with its inner end flush with the inner face of the head of said member, and a circular cutter rotatably mounted in the head of the other member with its axis farther away from the fulcrum of said members than the inner end of said needle guide so that as the device is operated said cutter will move substantially in a straight line and at the same time, after it engages the inner end of the needle in said needle guide, the cutter will have a turning movement.

4. A trimmer for talking machine needles including two members fulcrumed together shear-like, a needle guide secured in the head of one of said members and having a groove to receive a needle and with its inner end flush with the inner face of the head of said member, and a circular cutter having a hub-like portion rotatable in the head of the other member of the device and with the cutting edge flush with the face of the cutter opposite its hub and bearing flat against the inner surface of the needle guide holding member and in position when the device is operated to engage and trim the inner end of the needle.

5. A trimmer for talking machine needles including two members fulcrumed together shear-like, a needle guide secured in the head of one of said members and having a groove to receive a needle and with its inner end flush with the inner face of the head of said member, a circular cutter having a hub-like portion rotatable in the head of the other member of the device and with the cutting edge flush with the face of the cutter opposite its hub and bearing flat against the inner surface of the needle guide holding member and in position when the device is operated to engage and trim the inner end of the needle, and a spring in said cutter carrying member for forcing and holding the cutting edge of said cutter tightly against the inner face of the needle guide holding member.

6. A trimmer for talking machine needles

including two members fulcrumed together
shear-like, a needle guide secured in the
head of one of said members and having a
5 groove to receive a needle and with its inner
end flush with the inner face of the head of
said member, the inner face of the head of
the other member having a circular recess in
it farther from the fulcrum of said mem-
bers than the inner end of the needle guide,
10 and a circular cutter with the hub fitting in
said recess and with the cutting edge flush
with the opposite face of the cutter and
engaging the inner surface of the needle
guide holding member and in position when
15 operated to engage and trim the inner end
of the needle in said guide.

7. A trimmer for talking machine needles
including two members fulcrumed together
shear-like, a needle guide secured in the
20 head of one of said members and having a

groove to receive a needle and with its inner
end flush with the inner face of the head of
said member, the inner face of the head of
the other member having a circular recess
in it farther from the fulcrum of said mem- 25
bers than the inner end of the needle guide,
a circular cutter with the hub fitting in said
recess and with the cutting edge flush with
the opposite face of the cutter and engaging 30
the inner surface of the needle guide hold-
ing member and in position when operated
to engage and trim the inner end of the
needle in said guide, and a spiral spring
in said recess bearing against the hub of 35
said cutter for forcing the cutter against
the inner face of the needle guide holding
member.

In witness whereof, I have hereunto affixed
my signature.

FRANK O. WILKING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

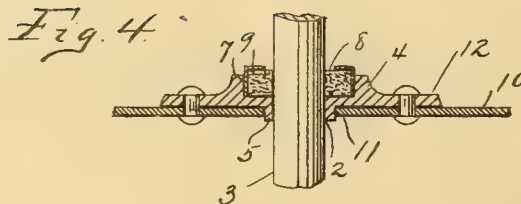
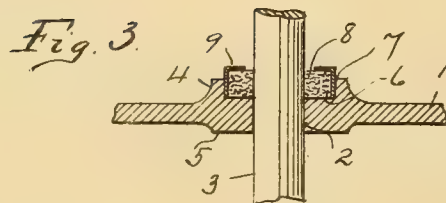
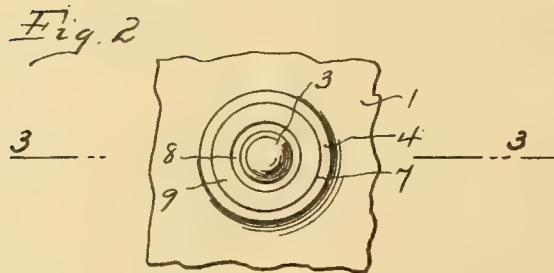
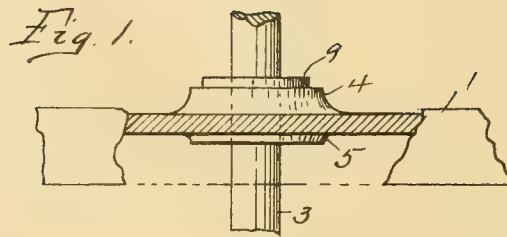
VERTICAL SPINDLE BEARING.

1,263,205 ----- P. Catucci,
Filed Apr. 26, 1917,
Patented Apr. 16, 1918.

P. CATUCCI.
 VERTICAL SPINDLE BEARING.
 APPLICATION FILED APR. 26, 1917.

1,263,205.

Patented Apr. 16, 1918.



Pliny Catucci INVENTOR.

BY

Louis M. Sanders ATTORNEY

UNITED STATES PATENT OFFICE.

PLINY CATUCCI, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
OTTO HEINEMAN PHONOGRAPH SUPPLY CO., INC., OF NEW YORK, N. Y., A CORPO-
RATION OF NEW YORK.

VERTICAL-SPINDLE BEARING.

1,263,205.

Specification of Letters Patent.

Patented Apr. 16, 1918.

Application filed April 26, 1917. Serial No. 164,597.

To all whom it may concern:

Be it known that I, PLINY CATUCCI, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Vertical-Spindle Bearings, of which the following is a specification.

My invention is more particularly adapted for use in connection with the driving spindles of talking machine motors, but from the nature of its structure, the bearing is capable of use in many other relations.

Hitherto it has been the practice of motor manufacturers to provide a simple aperture through the upper motor plate as a bearing for the turntable spindle, sometimes providing an additional bushing of hardened metal in such aperture, but more often the metal of the plate itself is relied upon solely as the bearing surface. The difficulty with such a construction lies in the fact that no provision is made for retaining a lubricant for the bearing and since the aperture through the motor plate is vertical, any liquid lubricant soon trickles down the spindle, leaving the bearing to "run dry". When the motor is in fairly constant use, such a bearing requires constant attention and frequent lubrication to obtain the best results.

The object of my invention, therefore is to provide an improved vertical spindle bearing of such a character as to contain means within itself for retaining a supply of lubricant sufficient for the purpose and yet not add materially to the cost of the structure.

Improvement in spring motors, in the last few years has been confined to matters of detail and refinement, in the direction of simplicity of structure and durability, as well as accuracy and uniformity of speed, and my present improvement is but one step in this direction.

In carrying out my invention I provide a structure substantially as illustrated in the accompanying drawings wherein—

Figure 1, is a side elevation, partly broken away, of a part of a motor frame, showing my improved spindle bearing.

Fig. 2, is a plan view of the same.

Fig. 3, is a cross section on line 3—3 of Fig. 2.

Fig. 4 illustrates a slight modification.

Similar reference numerals refer to like parts throughout the specification and drawings.

In the drawings I have only shown so much of the motor plate or frame as will suffice to show the application of my improvement.

The frame or plate 1, may be of cast iron or any suitable material and is provided with the vertical aperture 2, therein to receive the vertical driving spindle 3. Integral with the frame, are the upper and lower bosses 4, and 5, as shown. The upper boss 4, is counterbored as at 6, to provide an enlarged recess 7, into which is fitted a felt washer 8, which is centrally apertured for the passage of the spindle 3. Fitted into this recess 7, and partially covering the washer 8, is the inverted cup shaped cap 9, which, when in place, serves to retain the felt washer in position, and prevent its displacement. The washer, in practice, is inserted into the cap 9, which is then forced into the recess 7. Liquid lubricant may then be applied to the felt, to the point of saturation without fear of its following on down the spindle and leaving a dry bearing, since the felt washer serves as a reservoir to retain the lubricant, and supply it to the bearing in just sufficient quantity at all times to afford an easy running bearing.

In the modification shown in Fig. 4, the upper plate 10, is of sheet metal provided with an enlarged opening 11, into which is fitted and secured the flanged bushing bearing 12. The other parts of the structure, however are substantially the same as that hitherto described as for example, the upper and lower bosses 4, and 5, the aperture 2, recess 7, felt washer 8, and cap 9.

It will thus be seen that my improved bearing affords an ample reservoir for lubricant and is provided with means for retaining it without material loss or escape for a long time, thereby removing two of the common drawbacks of the common spring motor—constant attention and frequent lubrication.

As above indicated, my improved bearing may be used wherever a vertical shaft is used without sacrificing any of the advantages set forth.

I claim:

1. In a spindle bearing, the combination of a frame or plate having a counterbored,

apertured recess therein, a lubricant retaining washer fitted into the counterbored recess and a spindle in said aperture, and an inverted cup shaped cap frictionally secured
5 in said counterbored recess for holding said washer against displacement therefrom.

2. In a vertical spindle bearing, the combination of a vertically disposed spindle, an apertured support in which said spindle is

mounted, said support having a counter- 10
bored recess concentric with said spindle, and a lubricant retaining washer fitted into said recess and surrounding said spindle, and an inverted cup shaped cap frictionally secured in said counterbored recess for hold- 15
ing said washer against displacement therefrom.

PLINY CATUCCI.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE MECHANISM.

1,263,279 ----- A. E. Parnall,
Filed Sept. 18, 1916,
Patented Apr. 16, 1918.

A. E. PARNALL,
TALKING MACHINE MECHANISM.
APPLICATION FILED SEPT. 18, 1916.

1,263,279.

Patented Apr. 16, 1918.

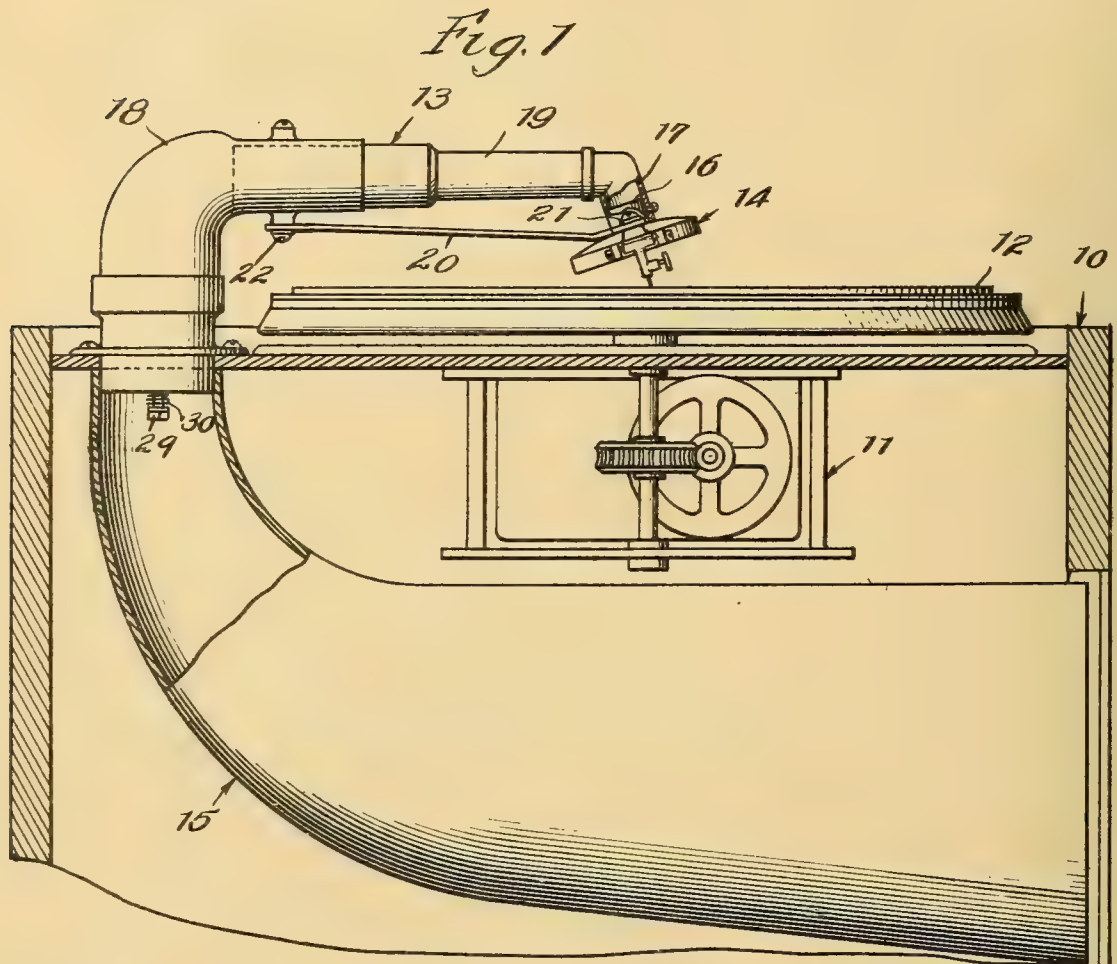
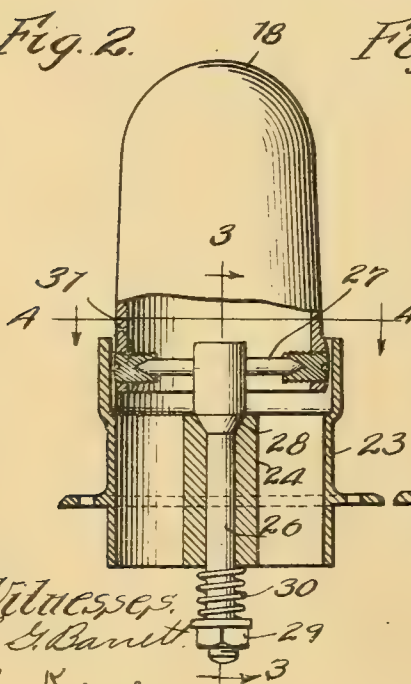


Fig. 2.



Witnesses:
H. E. Barnett
E. Kane

Fig. 3.

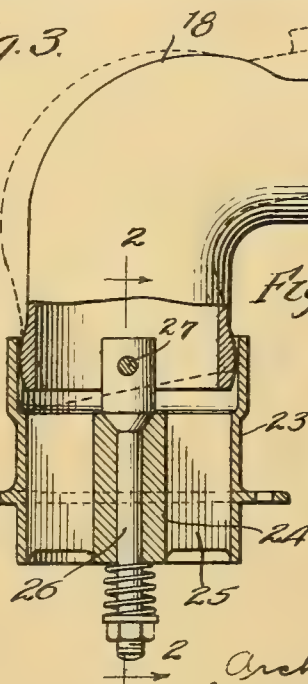
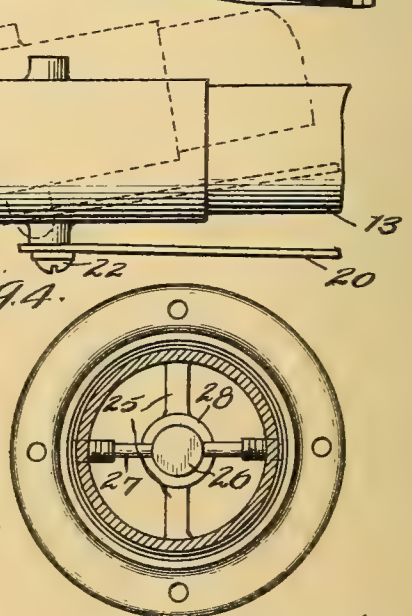


Fig. 4.



Inventor:
Archie E. Parnall
By Jones, Addington, Ames & Seibold
Att'y.

UNITED STATES PATENT OFFICE.

ARCHIE E. PARNALL, OF CHICAGO, ILLINOIS, ASSIGNOR TO FRANK W. WILLIAMS, OF CHICAGO, ILLINOIS.

TALKING-MACHINE MECHANISM.

1,263,279.

Specification of Letters Patent. Patented Apr. 16, 1918.

Application filed September 18, 1916. Serial No. 120,818.

To all whom it may concern:

Be it known that I, ARCHIE E. PARNALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Talking-Machine Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to talking machine mechanism.

One of the objects of my invention is to provide an improved connection between the tone arm and amplifier which will be simple in construction and durable, and which will permit movement of the tone arm about both vertical and horizontal axes.

In the drawings in which one embodiment of my invention is shown—

Figure 1 is a vertical section through a talking machine;

Fig. 2 is a detail sectional view substantially on the line 2—2 of Fig. 3;

Fig. 3 is a detail sectional view substantially on the line 3—3 of Fig. 2; and

Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 2.

Referring to the drawings in detail my invention is shown in connection with a talking machine comprising a casing 10, driving mechanism 11, housed in the casing, a record support 12 driven from the mechanism 11, a tone arm 13, a sound box 14 supported by the tone arm, and an amplifier 15 located in the casing and in communication with the tone arm.

The casing, driving mechanism, record support and amplifier may be of any usual or suitable construction, and are not described in detail.

In this application I have shown a construction of sound box claimed in my co-pending application, Serial No. 120,820 filed Sept. 18, 1916, which can be used with either the hill and dale groove type of record or the laterally undulating groove type of record which structure necessitates a tilting of the tone arm about a horizontal axis as well as a swinging about a vertical axis. In this construction the sound box has a tubular portion 16, rotatably mounted in the down-turned tubular portion 17 of the tone arm so that the sound box can be turned to move the needle from the position shown in

Fig. 1, used with the laterally undulating groove, to a position in which the needle lies directly beneath the axis of the tone arm, for use with a hill and dale type of record.

In order to keep the radius of movement of the needle approximately the same for both positions the tone arm is made in two telescoping sections 18 and 19, and a link 20 is pivoted at one end 21 to the sound box adjacent the needle arm and its other end is pivoted to the section 18 at 22. The free end of the tone arm has to be raised somewhat higher than shown in Fig. 1 when the sound box is turned for use with the hill and dale groove record. To provide for this lifting of the tone arm it is made so that it can swing about a horizontal axis as well as about a vertical axis. For this purpose a tubular sleeve 23 connecting the tone arm and amplifier has a bearing 24 centrally supported therein by means of arms 25, and a vertical shaft 26 mounted in the bearing 24 has secured at its upper end a horizontal pin or shaft 27 on which the tone arm is mounted to swing. The shaft 26 has a conical portion 28 for engagement with a conical portion of the bearing 24 to support the weight of the tone arm. For yieldingly holding the shaft 26 in place a nut 29 is threaded on the lower end of the shaft, and a spring 30 is located between the nut and bearing 24. To provide adjustable bearings for the horizontal pin 27 pivot bearings 31 are threaded into openings in the opposite sides of the tone arm. The lower end of the tone arm may be rounded where it fits in the sleeve 23 to make a good joint and allow movement of the arm.

The sleeve 23 is provided with a flange which rests on top of the casing.

In use the movement of the tone arm about a vertical axis on the shaft 26 permits the movement of the tone arm necessary for following the groove in the record, and the movement of the tone arm about a horizontal axis on the pin 27 permits the free end of the tone arm to be raised or lowered for the different types of record.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is;—

1. A talking machine comprising a vertical shaft provided with a conical face, a conical bearing therefor, a spring member acting on the bottom of said bearing to hold

said shaft in bearing position, a horizontal shaft supported on said first shaft, and a tone arm mounted to swing about said horizontal shaft as an axis.

5 2. A talking machine comprising an amplifier, a tubular member in connection therewith, a conical bearing supported centrally of said member, a vertical shaft provided with a conical face in said bearing, a
10 spring member acting on the bottom of said bearing to hold said shaft in bearing position, a horizontal shaft supported on said first shaft, and a tone arm mounted to swing about said horizontal shaft as an axis.

15 3. A talking machine comprising a vertical shaft provided with a conical face, a conical bearing therefor, a spring member acting on the bottom of said bearing to hold said shaft in bearing position, a horizontal
20 shaft supported on said first shaft, and a

tone arm mounted to swing about said horizontal shaft as an axis, said tone arm having an opening in its side, and a bearing threaded in said opening for said horizontal shaft.

4. A talking machine comprising a vertical shaft provided with a conical face, a bearing therefor, a horizontal shaft supported on said first shaft, a spring member acting on the bottom of said bearing to hold
30 said shaft in bearing position, and a tone arm mounted to swing about said horizontal shaft as an axis, said tone arm having opposed openings in its sides and bearings threaded in said openings for said horizontal
35 shaft.

In witness whereof, I have hereunto subscribed my name.

ARCHIE E. PARNALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

ILLUMINATING DEVICE.

1,263,315 ----- D. T. Finkbeiner,
Filed May 28, 1917,
Patented Apr. 16, 1918.

D. T. FINKBEINER.
ILLUMINATING DEVICE.
APPLICATION FILED MAY 28, 1917.

1,263,315.

Patented Apr. 16, 1918.

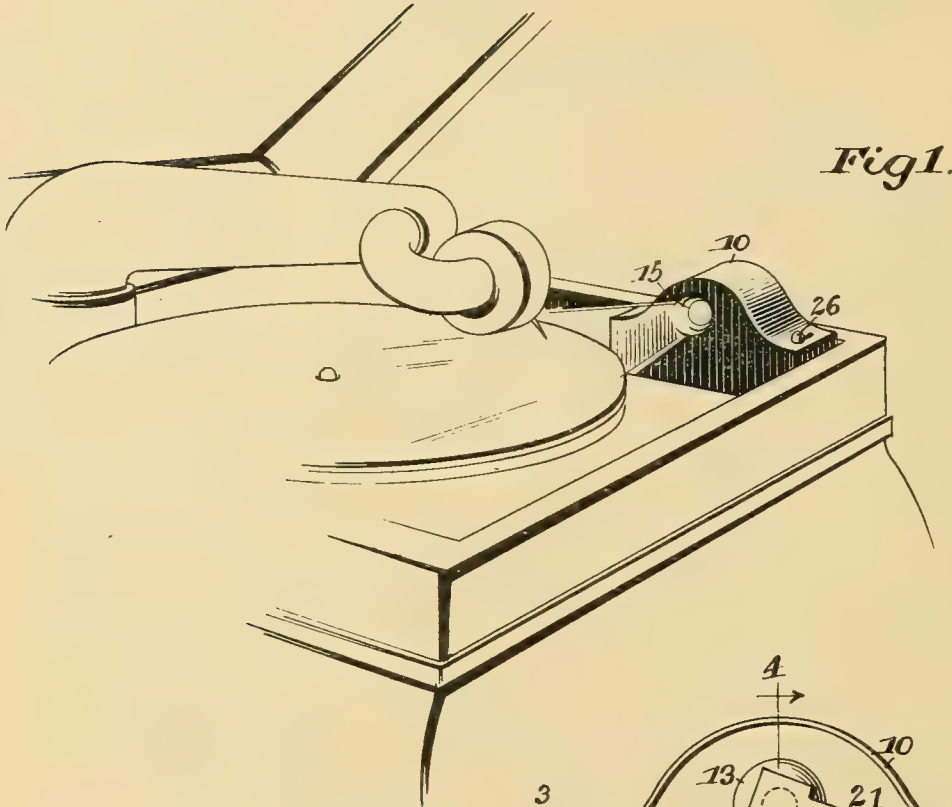


Fig. 1.

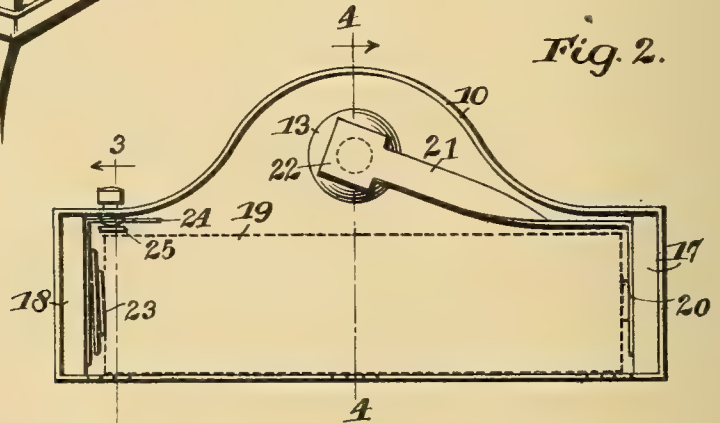


Fig. 2.

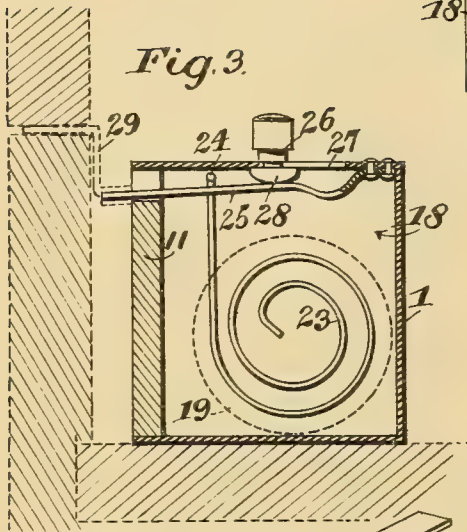


Fig. 3.

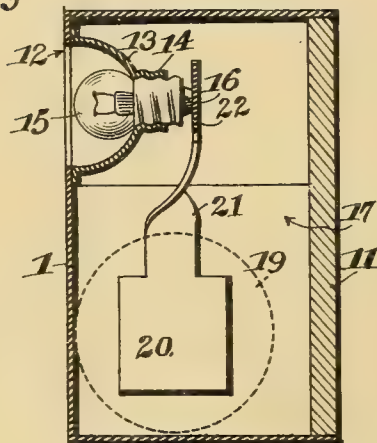


Fig. 4.

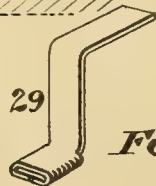


Fig. 5

Inventor

Daniel T. Finkbeiner.

By *James S. Stokes*

Attorney

UNITED STATES PATENT OFFICE.

DANIEL T. FINKBEINER, OF FREEPORT, PENNSYLVANIA.

ILLUMINATING DEVICE.

1,263,315.

Specification of Letters Patent.

Patented Apr. 16, 1918.

Application filed May 28, 1917. Serial No. 171,370.

To all whom it may concern:

Be it known that I, DANIEL T. FINKBEINER, a citizen of the United States, residing at Freeport, in the county of Armstrong and State of Pennsylvania, have invented new and useful Improvements in Illuminating Devices, of which the following is a specification.

This invention is a device for illuminating closed spaces or chambers into which light will not ordinarily penetrate to any considerable degree, because of obstructions or other causes.

One of the objects of the invention is to provide an illuminating device of simple and compact construction, which may be conveniently positioned within an obscurely lighted space to concentrate light at any particular desired local position. A further object is to provide a device of this type which may be placed contiguous to a door, cover, or other closure, and having means whereby it may be operated by said closure, or independently thereof, at will. A further device is to provide a portable device of the character mentioned, which is particularly applicable for use in the cabinets of sound reproducing machines, to illuminate the record, the stylus, and the record controlling devices, and which may be placed in position in any of the cabinets now in general use, without cutting or marring the same, or altering the positions of any of the parts.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—

Figure 1 is a perspective view illustrating the invention. Fig. 2 is a rear view, with the back plate or door removed and the battery shown in dotted lines. Fig. 3 is a transverse section on the line 3—3, Fig. 2. Fig. 4 is a similar section on the line 4—4, Fig. 2. Fig. 5 is a detail view of the detachable switch-operating arm.

Referring to the drawing, 10 designates a casing of any desired shape, provided with a removable back plate or a door, 11, it being preferred to construct the casing of metal, although the invention is not limited in this particular. The front wall of the casing is provided with an opening 12, and concentric therewith is a reflector 13, provided with a lamp socket 14, in which is mounted an incandescent lamp 15, said socket having

a base contact 16 electrically connected with one terminal of the lamp, the other terminal of the lamp being grounded through the casing.

Located at the ends of the casing are insulated supports 17, 18, the battery 19, of the usual dry cell type, being located between said supports. Attached to the support 17, is an end contact plate 20, provided with an angularly disposed resilient arm 21, overhanging the battery, and having an enlargement 22, which is pressed into contact with the base contact 16, by the resiliency of said arm. Attached to the support 18, is a spiral contact spring 23, one end of which bears against the base of the battery 19, the other end of the spring being bent to form an overhanging contact arm 24. Attached to the top of the case 10, is a spring contact arm 25, preferably constructed of flat resilient metal, so shaped that the resiliency thereof will hold its free end upwardly in contact with the contact arm 24. The top of the casing 10 is provided with a slot 27, immediately above and parallel with the contact arm 25, and working in said slot is the shank of a slidable button 26, the lower end of said shank being provided with a protuberance 28 frictionally engaging the contact arm. By shifting the button 26, along said slot, the circuit is closed or broken, as the case may be, by movement of the free end of contact arm 25 with respect to contact arm 24. Should it be desired to have the circuit broken automatically by means of a door or other closure, the contact 25 may be made of sufficient length to project through an opening in the back plate 11, and an angular operating arm 29, may be attached thereto, said arm having a socket to receive the end of said contact.

In operation, the battery 19 is placed between the contact spring 23 and the contact plate 21, being held in position by the resiliency of said spring, with its poles in circuit with said contacts. The circuit may be opened or closed, as previously stated, by movement of the button 26. When closed, the circuit is from the battery 19, through contact plate 20, arm 21 and enlargement 22, to the lamp and after passing through the latter, is grounded through the casing, passing through contact arm 25, and contact arm 24 and spring 23, to the battery. Should the arm 29 be employed, the closing of a door, such as the cover of the cabinet of a

sound reproducing machine, will bring said door into engagement with the angular portion of said arm, causing the same to pull contact arm 25 out of engagement with the
 5 contact arm 24, so that the circuit is broken while the door is closed, and illumination is not needed. As soon as the door is opened sufficiently, the resiliency of the contact arm will immediately bring the same into en-
 10 gagement with the contact arm 24, and close the circuit. Thus it will be seen that the circuit may be closed manually through button 26, or automatically by means of arm 29.

Having thus explained the nature of the
 15 invention, and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what is claimed is:—

20 1. An illuminating device of the character described comprising a casing, a battery supported in said casing in a normally horizontal position, a lamp above said battery, a battery retaining device engaging one end
 25 of said battery and having an overhanging contact arm, means for placing one terminal of said lamp in circuit with the other end of the battery, the other terminal of the lamp being grounded through the casing,
 30 and a switch arm attached to the casing and positioned to engage said contact arm.

2. An illuminating device of the character described comprising a casing, a battery supported in said casing in a normally hori-
 35 zontal position, a lamp above said battery, a battery retaining device engaging one end of said battery and having an overhanging contact arm, a flexible contact arm connect-
 40 ing one terminal of the lamp with the other end of the battery, the other terminal of

the lamp being grounded through the casing, and a switch arm attached to the casing and positioned to engage said contact arm.

3. An illuminating device of the character described comprising a casing, insulated
 45 supports at the ends of said casing, a flexible contact arm attached to one of said supports, a battery retaining device attached to the other support and having an offset over-
 50 hanging portion forming a contact arm, a battery engaging said flexible contact arm and said battery retaining device, a lamp supported by said casing and having one
 55 terminal in circuit with said flexible contact arm and the other terminal grounded through said casing, and a switch arm at-
 60 tached to the casing and positioned to engage said contact arm.

4. An illuminating device of the character described comprising a casing, a lamp sup-
 60 ported therein and having one terminal grounded through said casing, a battery in circuit with the other terminal of said lamp, a retaining device for the battery in circuit
 65 with said battery, said retaining device having a terminal contact, a contact arm electrically connected with said casing and lo-
 70 cated contiguous to said terminal contact, means for effecting relative movement of said contact arm and said terminal contact, and an offset operating arm detachably con-
 75 nected with said contact arm.

In testimony whereof I have hereunto set my hand in presence of two subscribing wit-
 80 nesses.

DANIEL T. FINKBEINER.

Witnesses:

C. S. D'ORVILLIERS,
 W. A. SHRYOCK.

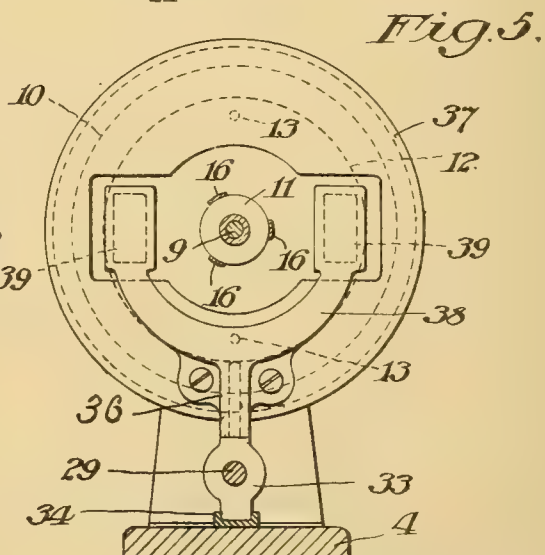
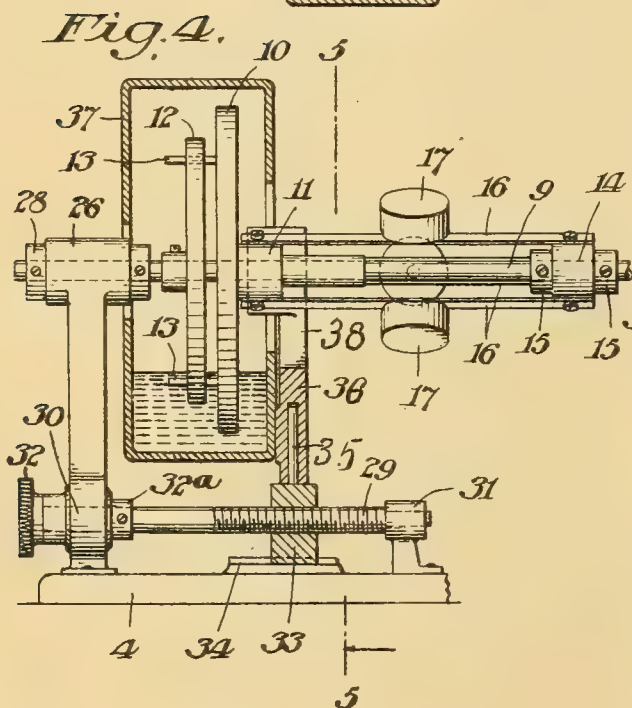
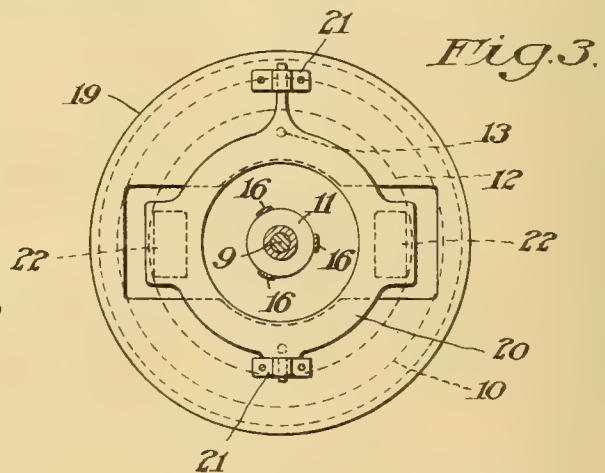
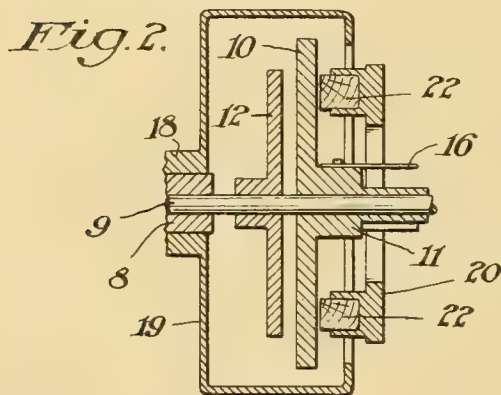
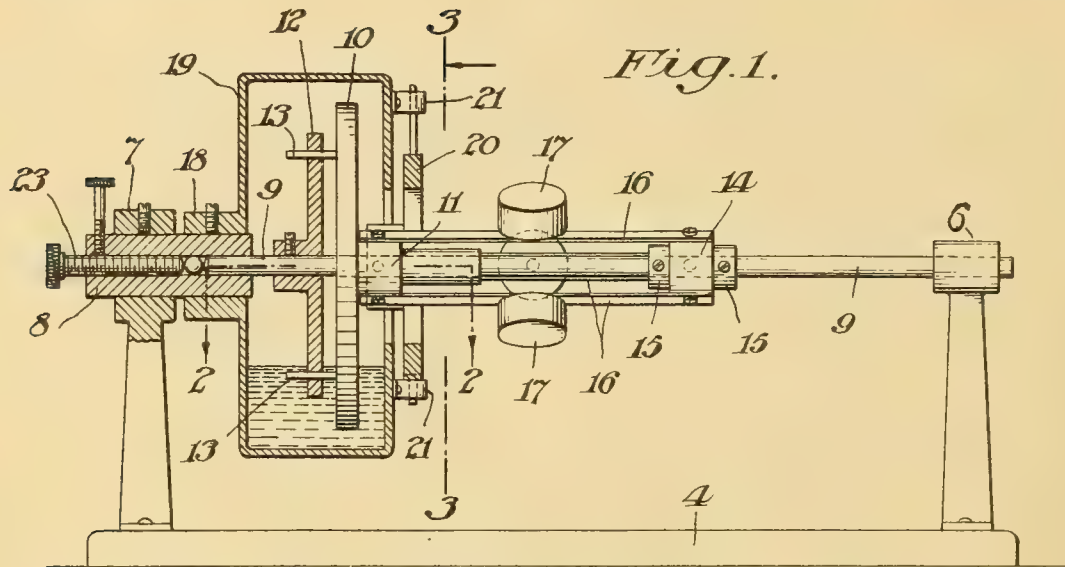
MOTOR GOVERNOR.

1,263,378 ----- R. F. Coleman,
Filed May 4, 1916,
Patented Apr. 23, 1918.

R. F. COLEMAN.
MOTOR GOVERNOR.
APPLICATION FILED MAY 4, 1916.

1,263,378.

Patented Apr. 23, 1918.



Inventor:
Robert F. Coleman
By *A. V. Grouse*
Attorney.

UNITED STATES PATENT OFFICE.

ROBERT F. COLEMAN, OF PHILADELPHIA, PENNSYLVANIA. ASSIGNOR OF ONE-HALF TO
GUSTAVE LYON, OF PHILADELPHIA, PENNSYLVANIA.

MOTOR-GOVERNOR.

1,263,378.

Specification of Letters Patent.

Patented Apr. 23, 1918.

Application filed May 4, 1916. Serial No. 95,390.

To all whom it may concern:

Be it known that I, ROBERT F. COLEMAN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Motor-Governors, of which the following is a specification.

My invention relates to improvements in speed governors employing a spring operated friction disk, for small motors such as used in talking machines and music boxes. The object of my invention is to provide a governor of novel, simple and efficient construction having provision: first, whereby the tendency to twist the springs around the shaft is lessened or practically obviated; secondly, whereby the friction between certain moving parts of the governor is lessened; thirdly, whereby the shattering or trembling of the shaft is obviated; fourthly, whereby oil may be supplied to the working parts; fifthly, whereby the springs are connected directly to a part of the friction disk without operating as part of the means for actuating the disk by the motor shaft; and, sixthly, whereby various novel and advantageous results are attained. With this object in view, my invention consists in the novel construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings, illustrating my invention:

Figure 1 is a longitudinal section, showing one form of embodiment of my invention.

Fig. 2 is a transverse section, on line 2—2 of Fig. 1.

Fig. 3 is a transverse section, on line 3—3 of Fig. 1.

Fig. 4 is a longitudinal section, showing another form of embodiment of my invention.

Fig. 5 is a transverse section, on line 5—5 of Fig. 4.

Referring first to Figs. 1, 2 and 3 of the drawings, 4 designates a suitable frame which includes two bearings 6 and 7. Secured within the bearing 7 is a supporting sleeve 8 which is set in axial alinement with the bearing 6; and mounted to rotate freely in the bearing 6 and sleeve 8 and also to move longitudinally therein is a shaft 9 which may be driven by any suitable motor, and the speed of which is governed by my

improved mechanism, as will be hereinafter described.

Surrounding the motor shaft 9 is a friction disk 10 having a hub or collar 11 which is mounted to turn freely on the shaft 9 and to slide longitudinally thereon. Secured on the shaft 9 adjacent to the disk 10 is a driving disk or member 12; and projecting fixedly from the friction disk 10 parallel to the shaft 9 are pins 13 which are slidably fitted within openings in the driving member 12, whereby, when the shaft 9 is rotated, the engagement of the driving member 12 with the pins 13 will cause the rotation of the friction disk 10, and the friction disk will be free to move longitudinally of the shaft 9. Mounted to rotate freely upon the shaft 9 in spaced relation to the collar 11 of the disk 10 is a collar 14 which is prevented from moving longitudinally of the shaft 9 by collars 15 secured on the shaft 9 on the respective sides of the collar 14. The collar 11 of the disk 10 is connected to the collar 14 by springs 16, the respective ends of which are secured to the collars 11 and 14. The springs 16 are provided with weights 17 which are secured thereto intermediate of their ends. When the shaft 9 and therewith the friction disk 10 are rotated, as previously explained, the disk 10 will rotate the springs 16 and the collar 14, for a purpose hereinafter explained.

Surrounding the sleeve 8 and secured thereto by a suitable set screw is a collar 18 carrying a casing 19 which incloses the friction disk 10 and the driving member 12, as shown. The casing 19 carries a friction member 20 which, as herein shown, is made in the form of a ring surrounding the shaft 9 and springs 16 and having opposite trunnions which are fitted in bearings 21 on the casing 19 to pivotally connect the member 20 to the casing. The member 21 is provided with two friction shoes 22 which are formed of suitable material and project into the casing 19 to be engaged by the friction disk 10. The purpose of pivoting the member 20 to the casing is to make the shoes automatically adjustable to bear against the disk 10 with the same pressure when the disk is moved against the shoes.

To adjust the shaft 9 and friction disk 10 longitudinally to vary the relation of the disk 10 and shoes 22, I provide a screw 23 which is screwed into the outer end of the

- sleeve 8 and engages a ball 24 which in turn engages the end of the shaft 9, the ball 24 being interposed within the sleeve 8 between the screw 23 and the shaft 9. By adjusting the screw 23 inwardly, the shaft 9 and therewith the disk 10 may be adjusted toward the shoes 22 of the member 20, and by adjusting the shaft 9 may be permitted to move in the reverse direction.
- Briefly described, the operation of the parts thus far referred to is as follows: As the motor driven shaft 9 attempts to speed up beyond the desired limit, the weights 17, by centrifugal action, will draw the central portions of the springs 16 outwardly and thereby force the friction disk against the friction shoes 22 of the member 20 and thereby control the speed of the shaft 9 and the motor driving it. During this operation, the driving member 12, engaging the pins 13 causes the rotation of the friction disk 10 without producing any substantial twisting action in the springs 16; and the collar 14 being free to rotate on the shaft 9, prevents any lost motion between the member 12 and pins 13 from producing any twisting action in the springs 16. As the centrifugal action of the weights 17 presses the disk 10 against the shoes 22 it also tends to press the shaft 9 against the ball 24; and, therefore, by adjusting the screw 23 the degree of pressure of the disk 10 against the shoes 22 and consequently the speed of the shaft 9 and the motor driving it may be nicely regulated. The lower portion of the casing 19 is adapted to contain a suitable quantity of oil through which the disk 10, its pins 13 and the driving member 12 pass for the lubrication thereof.
- Referring now to Figs. 4 and 5, the shaft 9, the friction disk 10 and its operating devices are the same as shown in Figs. 1, 2 and 3, and described with reference thereto, excepting that the shaft 9 extends through and is rotatable in a bearing 26 on a frame 27 and is provided with collars 28 which prevent longitudinal movement of the shaft. In this construction I provide a screw-threaded shaft 29 which extends parallel to the shaft 9 and is mounted to turn in suitable bearings 30 and 31 on the frame 27. The outer end of the shaft 29 is provided with a head 32 by means of which the shaft 29 may be turned and longitudinal movement of the shaft 29 is prevented by the head 32 and a collar 32^a on the shaft engaging the respective faces of the bearing 30. The shaft 29 carries a block 33 which is engaged by the threads on the shaft 29 to be moved thereby when the shaft is turned and which is guided by a raised portion 34 of the frame 27 over which the block 33 slides. The block 33 is provided with an upwardly projecting pivot pin 35 on which is pivoted a bracket 36 which carries a casing 37 which incloses the member 12 and disk 10. The bracket 36 has projecting arms 38 which carry friction shoes 39 adapted to be engaged by the friction disk 10 when the shaft 9 is rotated as previously described. By turning the screw 29 the block 33 and therewith the bracket 36, casing 37 and shoes 39 may be adjusted to vary the degree of pressure of the disk 10 against the shoes 39 to regulate the speed of the shaft 9 and the motor driving it. By pivoting the bracket 36 on the block 33, as shown, the friction shoes 39 may adjust themselves automatically to bear with the same degree of pressure against the friction disk 10.
- I claim:
1. The combination of a rotatable shaft, a collar on the shaft, means to prevent longitudinal movement of the collar on the shaft, a friction disk slidable on said shaft, weighted parts connecting the collar and the disk and adapted to move the latter longitudinally on the shaft, and a pivoted friction member embracing said shaft and provided with two projecting parts adapted to be engaged by said disk on the respective sides of the shaft and on the respective sides of the axis of the pivot of the member.
 2. The combination of a rotatable shaft, a collar on the shaft, means to prevent longitudinal movement of the collar on the shaft, a friction member supported adjacent to the shaft, a friction disk slidable on said shaft toward and from said member and adapted to engage the same, weighted parts connecting the collar and the disk and adapted to move the latter longitudinally of the shaft, a driving member fixed on said shaft and having an opening therein, and a pin projecting from said disk and slidable within said opening, whereby the driving member causes the rotation of the disk with and permits it to be moved longitudinally of the shaft.
 3. The combination of a rotatable shaft, a collar rotatably mounted on the shaft, means to prevent the collar from moving longitudinally of the shaft while permitting the collar to turn on the shaft, a friction member supported adjacent to the shaft, a friction disk slidable on said shaft toward and from said member and adapted to engage the same, weighted parts connecting the collar and the disk and adapted to move the latter longitudinally of the shaft, and means to cause the disk to turn with the shaft and to permit the disk to move longitudinally of the shaft.
 4. The combination of a rotatable shaft, a collar rotatably mounted on the shaft, means to prevent the collar from moving longitudinally of the shaft and to permit the collar to turn on the shaft, a friction member supported adjacent to the shaft, a friction disk slidable on said shaft toward and from said

member and adapted to engage the same, weighted parts connecting the collar and the disk and adapted to move the latter longitudinally of the shaft, a driving member fixed
5 on said shaft and having an opening therein, and a pin projecting from said disk and slidable within said opening, whereby the driving member causes the rotation of the disk with and permits it to be moved longitudinally of the shaft.
10

5. The combination of supporting means, a shaft mounted to rotate in the supporting

means, a friction disk carried by the shaft, means carried by the shaft and controlled by the speed thereof for moving the disk longitudinally of the shaft, a casing adjustably
15 supported by the supporting means and inclosing the friction disk, and a friction member pivoted on the casing adjacent to and adapted to be engaged by the friction disk.
20

In testimony whereof I affix my signature hereto.

ROBERT F. COLEMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

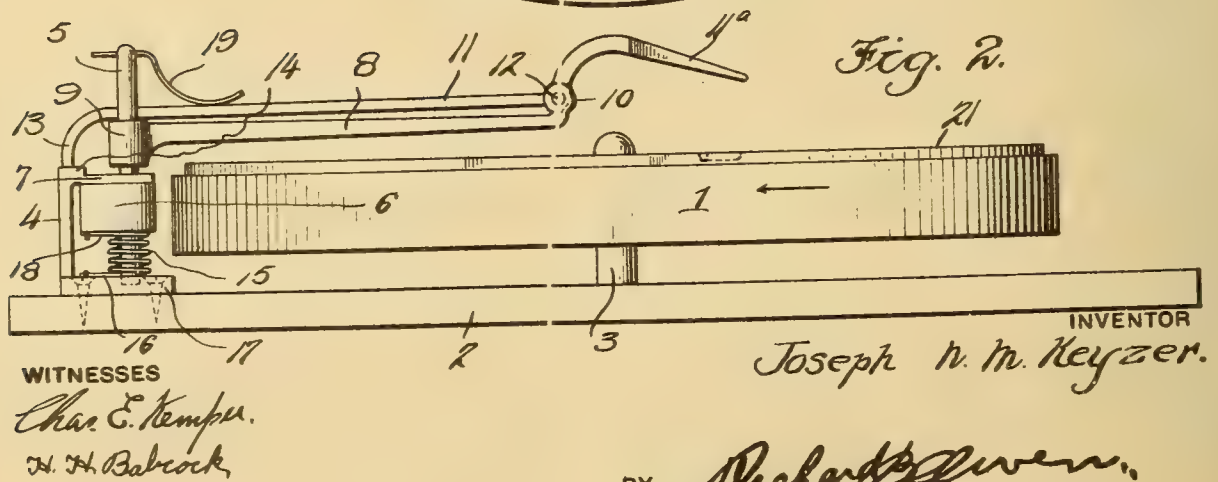
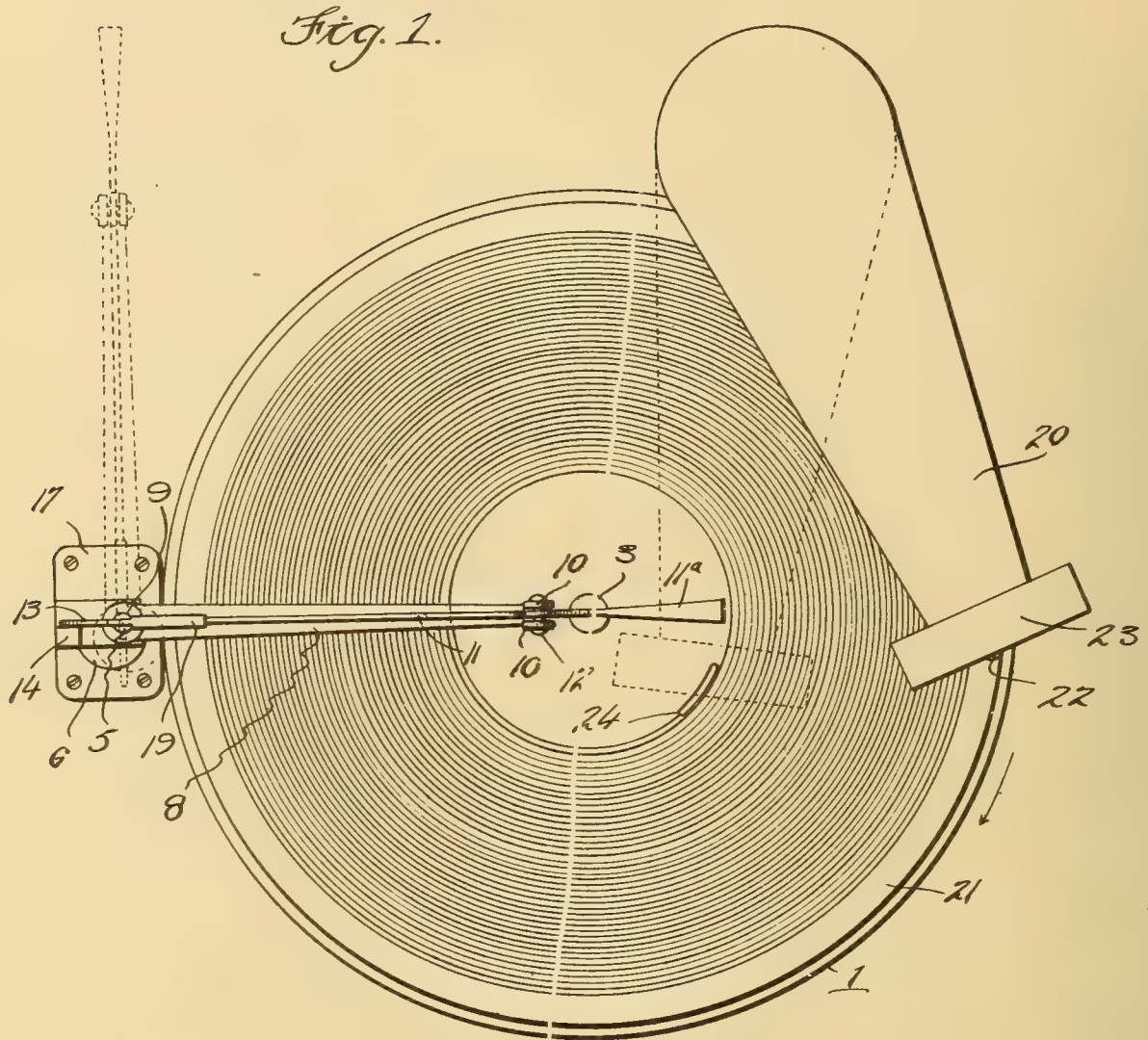
PHONOGRAPH CUT-OFF.

1,263,433 ----- J. N. M. Keyzer,
Filed Apr. 28, 1917,
Patented Apr. 23, 1918.

J. N. M. KEYZER.
 PHONOGRAPH CUT-OFF.
 APPLICATION FILED APR. 28, 1917.

1,263,433.

Patented Apr. 23, 1918.
 2 SHEETS—SHEET 1.



J. N. M. KEYZER.
 PHONOGRAPH CUT-OFF.
 APPLICATION FILED APR. 28, 1917.

1,263,433.

Patented Apr. 23, 1918.

2 SHEETS—SHEET 2.

Fig. 4.

Fig. 3.

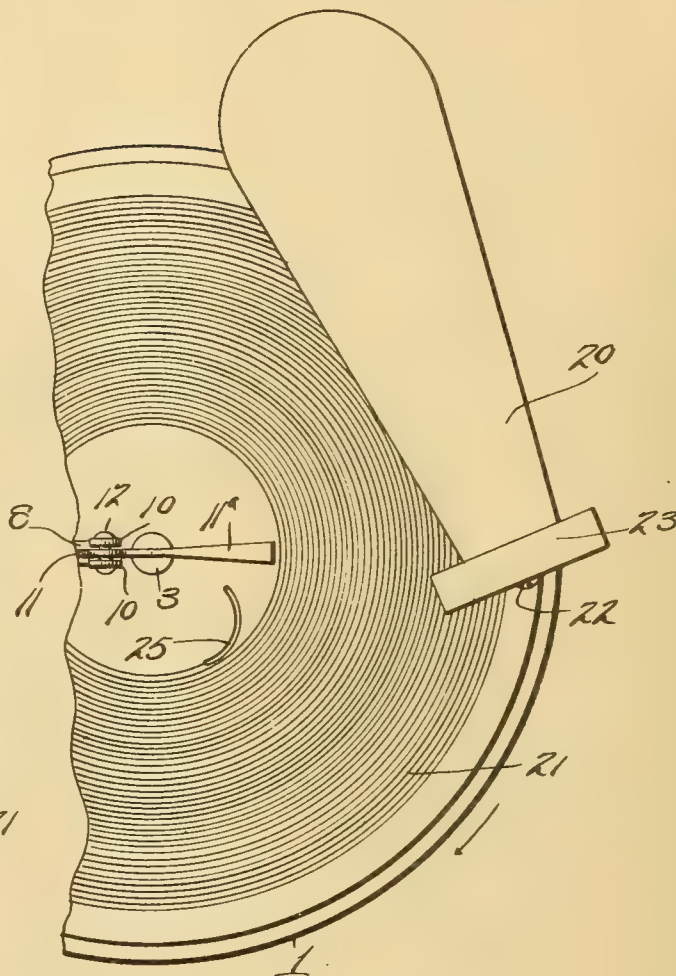
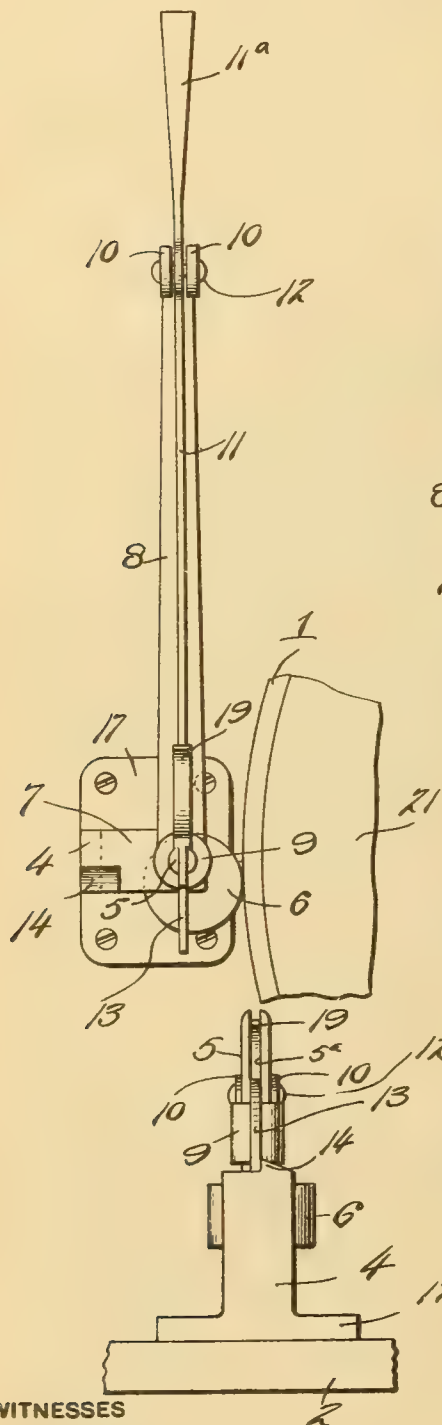
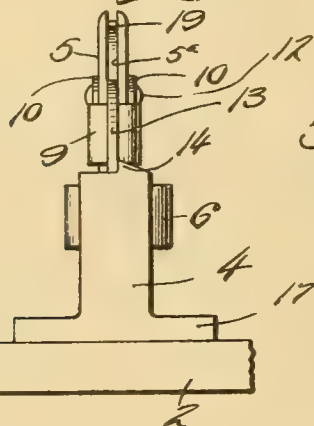


Fig. 5.



WITNESSES

Chas. E. Kemper.
H. H. Balcock,

INVENTOR

Joseph N. M. Keyzer.

BY

Richard E. Owen,

ATTORNEY

UNITED STATES PATENT OFFICE.

JOSEPH N. M. KEYZER, OF LYNCHBURG, VIRGINIA.

PHONOGRAPH CUT-OFF.

1,263,433.

Specification of Letters Patent.

Patented Apr. 23, 1918.

Application filed April 28, 1917. Serial No. 165,195.

To all whom it may concern:

Be it known that I, JOSEPH N. M. KEYZER, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented certain new and useful Improvements in Phonograph Cut-Offs, of which the following is a specification.

This invention relates to phonograph cut-offs, and more particularly to a braking attachment for a phonograph which is especially adapted to be actuated by the tone arm so as to stop the table when the end of the piece being reproduced has been reached thus eliminating the scratching of the needle over the disk after the completion of a piece.

One of the main objects of the invention is to provide an automatic cut-off or braking attachment for phonographs of simple construction and operation which may be readily applied to a phonograph of standard construction. A further object is to provide a device of the character stated which is actuated by the tone arm so as to stop the rotation of the table carrying the disk when the tone arm has reached a predetermined position above the table. A further object is to provide resilient means for stopping the rotation of the table so as to eliminate all danger of injury to the phonograph due to sudden stoppage of the table. A still further object is to provide a braking member which is movable into and out of engagement with the peripheral face of the table together with means for normally holding this member in inoperative position, means being provided above the table and engageable by a tone arm movable over the table for releasing the braking member and permitting the same to be moved into engagement with the table. Further objects will appear from the detailed description.

In the drawings:—

Figure 1 is a top plan view of a braking attachment constructed in accordance with my invention as applied,

Fig. 2 is a side view of the same,

Fig. 3 is a fragmentary top plan view of a modified form,

Fig. 4 is a top plan view of the braking device and the tripping means therefor, and

Fig. 5 is a back view of the same.

The table 1 is rotatably supported above

the top 2 of the phonograph casing on the shaft 3, in the usual manner, this table being rotated by the well known spring motor or by any other equivalent means. A U-shaped bracket 4 is secured to the top 2, the open side of this bracket being positioned closely adjacent the peripheral face of table 1. A vertical shaft 5 is rockably mounted in bracket 4. A relatively thick rubber disk 6 is secured on shaft 5 beneath the upper arm 7 of bracket 4. This disk is secured eccentrically on the shaft so that, when the shaft is rocked in a counter-clockwise direction, the disk will be moved into engagement with the table 1, thus serving to brake the same.

The shaft 5 projects a considerable distance above the upper arm 7 of bracket 4. A supporting arm 8 is provided at its outer end with an integral sleeve 9 which fits snugly about the shaft, the arm being thus mounted for movement with the shaft in either direction. Arm 8 extends, when in operative position, inward above the table 1 to within a short distance of the center thereof. This arm is turned up at a right angle at its inner end and is bifurcated to form the spaced supporting ears 10. A trip lever 11 is pivotally secured between the ears 10 by a pivot pin 12 inserted through the same and through the ears. This lever extends outwardly through the upper portion of shaft 5, which is bifurcated for this purpose as at 5^a, and is then turned downward to provide a locking finger 13. This finger 13 engages behind an integral lug 14 formed on the upper arm 7 of bracket 4. A coil spring 15 is mounted about shaft 5 below disk 6 and has its lower arm 16 secured to the bottom plate 17 of bracket 4, and its upper arm 18 secured to the under face of disk 6. This spring 15 acts to normally swing the disk 6 inward toward the table 1, as will be clear from Fig. 2 of the drawings. A leaf spring 19 is secured in the upper end of shaft 5 and acts to normally hold the outer end of trip lever 11 depressed with the locking finger 13 behind lug 14 thus effectually preventing inward movement of disk 6. When the tripping shaft 11 is secured in this position, the inner arm 11^a thereof projects across the center of the table. This inner arm is inclined downward and inward as in Fig. 2 of the drawings, and is broadened

to provide a member adapted to be engaged by the tone arm 20 of the phonograph which is movable across the disk 21 in the usual manner. The outer arm of tripping shaft 5 11 is approximately three times as long as the inner arm 11^a so that but very slight depression of this inner arm will be sufficient to raise the locking finger 13 above the lug 14 thus permitting the disk 6 and 10 shaft 5 to which this disk is secured, to be rocked in a counter-clockwise direction by the coil spring 15.

In using this braking device, the disk 21 is of special construction. In the preferred 15 form illustrated in Figs. 1 and 2, the disk is provided on its upper face with the usual spiral thread which receives the stylus or needle 22 carried by the reproducer 23. At the inner end of this thread, the disk is pro- 20 vided with an arcuate recess 24. This recess is positioned on the disk immediately at the end of the piece which is to be reproduced. As the table 1, and consequently disk 21, is rotated in the direction indicated, 25 the tone arm 20 will be swung in toward the center of the disk. When the end of the piece being reproduced is reached, the tone arm will be immediately above the inner end portion of inner arm 11^a of trip lever 11. 30 When the needle drops into the recess 24, the tone arm will engage the inner arm of the trip lever thus depressing the same and raising the locking finger 13 above the lug 14. As soon as the finger 13 is raised out of 35 engagement with lug 14, the coil spring 15 acts to swing disk 6 into engagement with the peripheral face of table 1, this disk yieldingly engaging the table due to its resiliency, thus stopping the table quickly but 40 avoiding all undue shocks or jars. When the disk 6 is rocked into operative position, the shaft 5 will also be rocked in a counter-clockwise direction, thus swinging the arm 8 and the trip lever 11 outward from above 45 the disk 21, in the direction indicated by the arrow in Fig. 1 of the drawings. By this construction, the table is stopped as soon as the end of the piece being reproduced has been reached, and the supporting 50 arm and trip lever 11 are automatically swung from above the table thus permitting easy removal of the disk and the placing of a new disk upon the table. When the new disk has been placed upon the table, the 55 inner arm 11^a of trip lever 11 may be grasped and depressed slightly, after which the lever and arm 8 are swung inward over the new disk into their initial position, the locking finger 13 again engaging behind the 60 lug 14, this movement of the trip lever and supporting arm also serving to move the braking disk 6 out of engagement with the table 1 so as to release the same.

The form of disk in which the recess 24 is 5 used must, necessarily, be relatively thick in

order to permit any appreciable drop in the tone arm 20. For this reason, I only use this recess in connection with thick disks such as the Edison standard disk now in common 70 use. In disks of the thinner type, I prefer to employ an arcuate groove 25 which communicates with the thread of the disk immediately at the end of the piece being repro- 75 duced. This groove is so curved as to cause the tone arm 20 to swing inward into engagement with the inner arm 11^a of the trip lever 11, thus depressing the same and releasing the braking device in the manner 80 previously described.

This device is more particularly adapted 80 for use in connection with the Edison phonograph, but it will be evident that it may be equally well used with any other standard phonograph with slight variations in 85 construction. The device may be quickly and easily applied without necessitating any change whatever in the construction of the phonograph itself, and, as above pointed 90 out, when the table is stopped the tripping lever and the supporting arm therefor are automatically moved from above the table thus permitting ready removal of the disk, which I consider an important feature of 95 my invention.

What I claim is:—

1. In phonograph cut-offs, a rotary table, 95 a shaft rockably mounted adjacent the periphery of the table, a resilient braking member eccentrically secured on said shaft, means for normally holding the shaft in 100 rocked adjustment so as to hold said braking member out of engagement with said table, means for rocking the shaft when released so as to move the braking member into en- 105 gagement with the table, and means carried by the shaft and engageable by a tone arm moved across the table for releasing said shaft when the tone arm reaches a predeter- 110 mined position above the table.

2. In phonograph cut-offs, a bracket, a 110 shaft rotatably mounted therein, a braking disk eccentrically secured on said shaft, means for rotating the shaft in one direction, a tripping lever pivotally supported inter- 115 mediate its ends and adapted to be engaged by the tone arm of a phonograph so as to have its inner arm depressed thereby, and a member carried by the said bracket and in engagement with the outer arm of said lever 120 for normally locking the shaft against rotation.

3. In phonograph cut-offs, a bracket, a 125 shaft rotatably supported therein, a braking disk eccentrically secured on said shaft, means for rotating the shaft in one direction, a supporting arm carried by said shaft and projecting radially of the same, and a tripping lever pivotally mounted interme- 130 diate its ends in the inner end of the said supporting arm, said bracket being provided

with an integral lug and the outer end of said lever normally engaging said lug so as to lock the shaft against rotation.

5 4. In phonograph cut-offs, a bracket, a shaft rotatably mounted therein, a braking disk eccentrically secured to said shaft, means for rotating the shaft in one direc-
tion, a supporting arm mounted on said shaft and projecting radially therefrom, a
10 tripping lever pivotally mounted intermediate its ends in the inner end of said supporting arm, said tripping lever projecting through the upper portion of said shaft and

having its outer end formed to provide a locking finger, the upper portion of said shaft being bifurcated to accommodate the tripping lever, and a locking lug carried by the bracket and engageable by the locking finger of said tripping lever for normally locking the shaft against rotation. 15 20

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH N. M. KEYZER.

Witnesses:

M. E. JONES,

M. A. O'CONNOR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND BOX. .

1,263,466 ----- R. J. Prettie,
Filed July 31, 1915,
Patented Apr. 23, 1918.

1,263,466.

Patented Apr. 23, 1918.

Fig. 1,

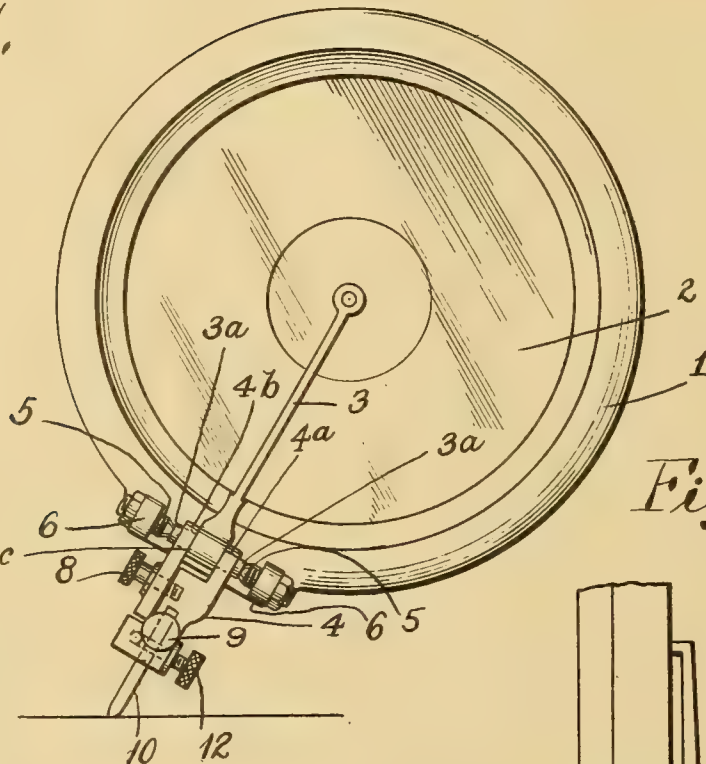


Fig. 2,

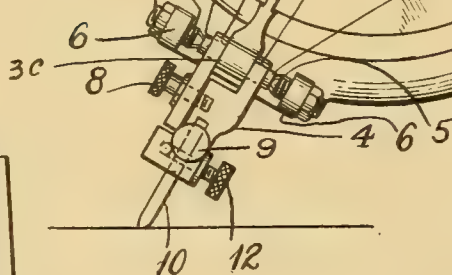


Fig. 3,

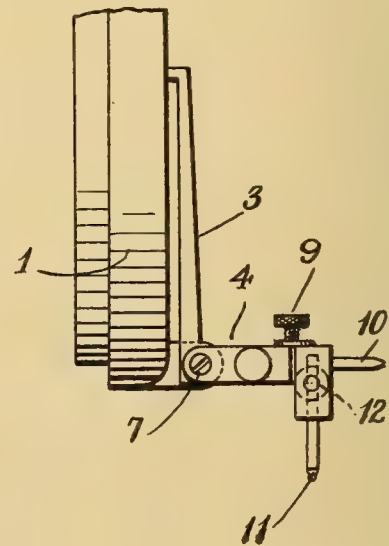


Fig. 4,

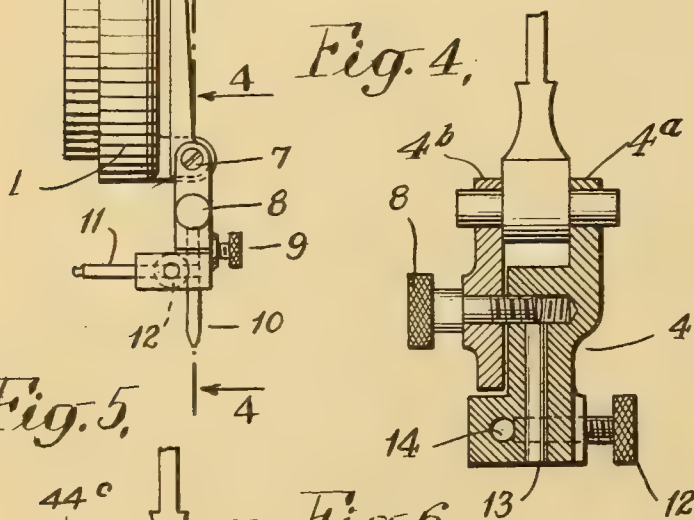


Fig. 5,

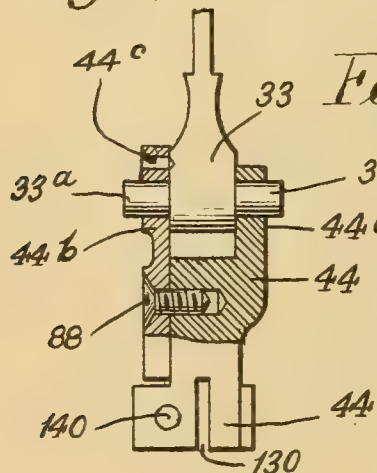
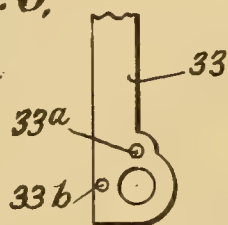


Fig. 6,



INVENTOR
Richard James Prettie
BY
E. W. Scherr Jr
ATTORNEY

UNITED STATES PATENT OFFICE.

RICHARD JAMES PRETTIE, OF JAMAICA, NEW YORK, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

SOUND-BOX.

1,263,466.

Specification of Letters Patent.

Patented Apr. 23, 1918.

Application filed July 31, 1915. Serial No. 42,951.

To all whom it may concern:

Be it known that I, RICHARD JAMES PRETTIE, a citizen of the United States, residing at Jamaica, in the county of Queens and State of New York, have invented certain new and useful Improvements in Sound-Boxes, of which the following is a specification.

My present invention relates to improvements in sound-boxes and comprises improvements whereby the sound-box is adapted to be converted to play either lateral or vertical wave records. The features and advantages of my improvements will be apparent to those skilled in the art from an understanding of the following description in connection with the drawings.

In the latter Figure 1 is a face-view of a sound-box illustrating one form or embodiment of my improvements shown as if playing a lateral-wave disk-record; Fig. 2 is a partial edge view of the sound-box in Fig. 1; Fig. 3 is similar to Fig. 2 except that it shows my device adjusted as if to play a vertical wave disk record; Fig. 4 is an enlarged vertical section partly in elevation on the line 4—4 in Fig. 2 looking in the direction of the arrows; Fig. 5 is a modification, the view being otherwise similar to Fig. 4; and Fig. 6 is a side view of one of the parts in Fig. 5.

I will now describe the specific devices of the drawings: 1 is the casing of the sound-box and 2 the diaphragm. The stylus bar comprises an upper part 3 and a lower part 4, said parts being pivoted to each other, so that the lower part can be adjusted either to extend in continuation of the upper part as in Figs. 1 and 2 for playing lateral wave records, or to extend transversely to the upper part as in Fig. 3 to play vertical wave records.

One end of the part 3 is attached to the diaphragm whereas the other end has transverse oppositely directed cylindrical extensions or trunnions 3^a, in whose ends are formed suitable centers or bearings for the points of the pivot-screws 5 which are tapped into and extend through the stationary lugs 6 on the casing 1 of the sound-box. The end 7 of each screw may be slotted, to enable said screws to be adjusted by a screw driver in the lugs 6 to form pivotal bearings for the stylus bar to oscillate upon; see Fig. 2.

The lower part 4 of the stylus bar has a pair of spaced lugs 4^a and 4^b, the latter being a loose or adjustable part. A shouldered screw 8, passing freely through the lug 4^b, is tapped into the part 4. At their ends adjacent the space between the lugs, both of them are bored so as to receive the trunnions 3^a through them whereby the lower part 4 of the stylus bar can be pivoted as aforesaid into and out of the positions shown in Figs. 2 and 3. When the part 4 has been adjusted into the desired position, the screw 8 is tightened with the result that the lugs 4^b and 4^a are caused to clamp against the larger portion 3^c of the stylus bar from which the trunnions 3^a project, the net result being that said lower and upper parts of the stylus bar are now rigidly united and will act as one bar or lever in the playing of the records, the pivoting of the entire bar being on the points of the pivot screws 5.

The lower part 4 has a longitudinal socket in its free end guarded by set-screw 9 to receive and hold a needle or other suitable stylus 10 adapted to play lateral wave records.

On the other hand, 11 is a stylus adapted to play vertical wave records, it being located in a transversely extending socket formed in the back of the lower stylus-bar part 4, said socket being guarded by a set-screw 12.

In the enlarged view Fig. 4, the socket for the lateral-wave stylus is designated 13 and that for the vertical wave stylus is designated 14. It will be seen that they are transverse to each other but not in the same plane, so that their socket ends can cross each other and thereby provide ample seats for the styli in the part 4 without unduly enlarging or thickening it.

Figs. 5 and 6 show a modification wherein the thumb or set-screw 8 is replaced by an ordinary screw 88 which permanently secures the parts 44^a and 44^b together. The part 44^b is the same as the part 4^b in the preceding figures except that it carries a longitudinally yielding detent pin 44^c intended to spring into one or the other of the sockets 33^a or 33^b in the side of the stylus-bar 33 and thereby automatically lock the stylus-bearing part 44 to the stylus-bar 33 in the several operative positions of said part heretofore described in connection with the earlier figures.

What I claim is:—

1. A sound-box, provided with a stylus-bar having a part furnished with two separate stylus sockets, one for lateral wave records and the other for vertical wave records; said part being adjustable relatively to the sound-box to bring a stylus in either socket into position for coöperation with a record suitable to it.
2. A sound-box, provided with a stylus-bar having an end-part furnished with two separate stylus sockets, one for lateral wave records and the other for vertical wave records; said end-part being pivotable relatively to the sound-box to bring a stylus in either socket into position for coöperation with a record suitable to it.
3. A sound-box, provided with a stylus-bar having an end-part furnished with two separate stylus sockets, one for lateral wave records and the other for vertical wave records; said end-part being pivotable relatively to the sound-box to bring a stylus in either socket into position for coöperation with a record suitable to it; and releasable locking means for securing said end-part rigidly to the main part of the stylus-bar in its different pivotal positions.
4. A sound-box comprising a stylus-bar whose lower part carries two styli for lateral and vertical wave records respectively, said lower part being pivotable relatively to the upper part of said stylus-bar into different playing positions suitable for playing the respective kinds of records with the respective styli adapted thereto, the stylus-bar being pivotally supported on the sound-box, the pivotal axis of said support coinciding with the axis of the pivotal connection between the lower and upper parts of said bar.
5. A sound-box comprising a casing, a diaphragm, and a stylus bar pivotally supported on the casing and comprising parts which are pivotal relatively to each other, the pivotal axis of said parts on each other and of the bar on the casing being coincident, one of said parts being connected to the diaphragm, and the other being the stylus bearing part, said last named part having two pivotal positions of adjustment for playing, respectively, lateral and vertical wave records without changing the box, and two styli positioned on said part to be respectively brought into play by said adjustment of said part.
6. A sound-box comprising an operatively supported stylus bar whose lower part is adjustable from a position in alinement with the upper part to a position transverse to said upper part, and means on said lower part for holding a lateral wave record stylus projecting in continuation of the free-end of said lower part, and for holding a vertical-wave record stylus projecting transversely from the back of said lower part.
7. A sound-box comprising a casing, a diaphragm, and a stylus bar pivotally supported on the casing and comprising parts which are pivotal relatively to each other, one of said parts being connected to the diaphragm, and the other being the stylus bearing part, said last named part having two pivotal positions of adjustment for playing respectively lateral and vertical wave records without changing the position of the box, and two styli positioned on said part to be respectively brought into play by said pivotal adjustment of said part.
8. A sound-box comprising a casing, a diaphragm, and a stylus bar pivotally supported on the casing and comprising parts which are pivotal relatively to each other, one of said parts being connected to the diaphragm, and the other being the stylus bearing part, said last named part having two pivotal positions of adjustment for playing respectively lateral and vertical wave records without changing the position of the box, and two styli positioned on said part to be respectively brought into play by said pivotal adjustment of said part; and locking means for securing rigidly together the two parts of the stylus-bar in their said different positions of relative pivotal adjustment.
9. A sound-box, provided with a stylus-bar having an end-part furnished with two separate stylus holders occupying a permanent position relative to each other, one for lateral wave records and the other for vertical wave records; said end-part being adjustable relatively to the main part of the stylus-bar to bring either holder into playing position.
10. A sound-box provided with a stylus bar having an end-part furnished with two separate stylus sockets permanently disposed in angular relation to each other, one for lateral wave records and the other for vertical wave records; said lower part being adjustable relatively to the main part of the stylus-bar to bring a stylus in either socket into position for coöperation with a record suitable to it.

In testimony whereof, I have signed my name to this specification, this 28 day of July, 1915.

RICHARD JAMES PRETTIE.

SPRING MOTOR.

1,263,587 ----- W. E. Merryman,
Filed Oct. 15, 1917,
Patented Apr. 23, 1918.

W. E. MERRYMAN.
 SPRING MOTOR.
 APPLICATION FILED OCT. 15, 1917.

1,263,587.

Patented Apr. 23, 1918.

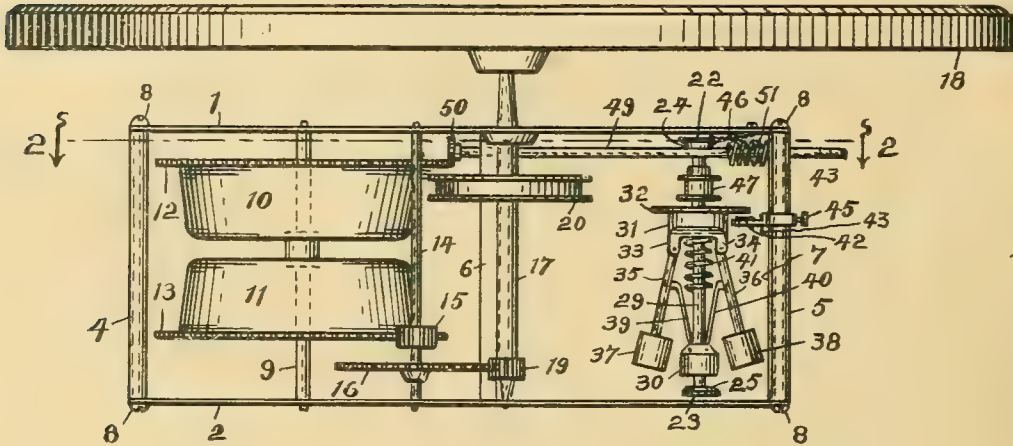


Fig. 1.

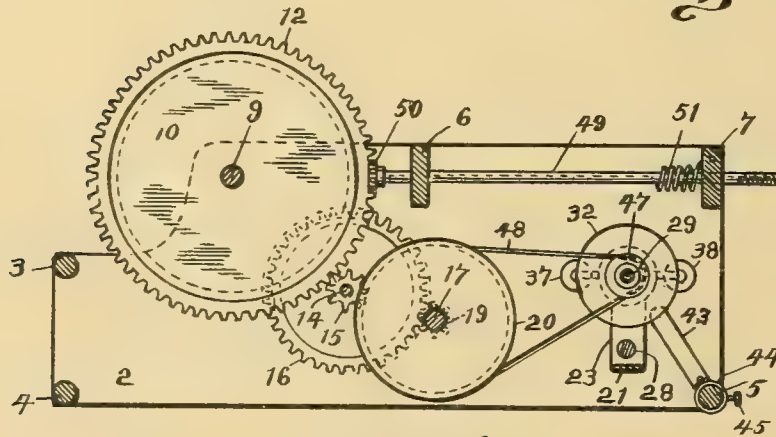


Fig. 2.

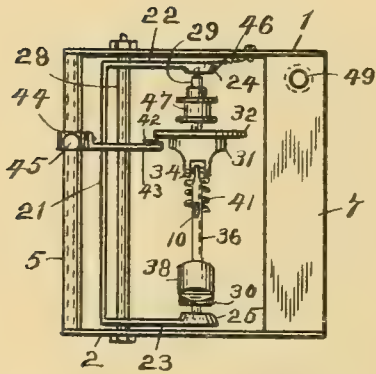


Fig. 3.

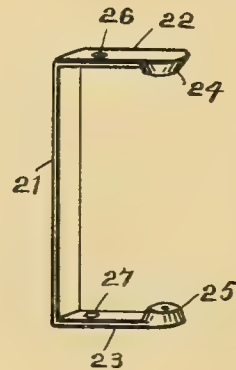


Fig. 4.

Inventor:

W. E. Merryman,

By

Robert W. Lander,

Attorney

Witness:
 Adelaide Kearns.

UNITED STATES PATENT OFFICE.

WILLIAM ESTEL MERRYMAN, OF RICHMOND, INDIANA.

SPRING-MOTOR.

1,263,587.

Specification of Letters Patent.

Patented Apr. 23, 1918.

Application filed October 15, 1917. Serial No. 196,565.

To all whom it may concern:

Be it known that I, WILLIAM ESTEL MERRYMAN, a citizen of the United States, residing in the city of Richmond, in the county of Wayne, State of Indiana, have invented a new and useful Construction for Spring-Motors, of which the following is a full, clear, and comprehensive specification, the same being such as will enable others to make and use the same with exactitude in order to attain the highest degree of efficiency.

The object of this invention is to produce a spring-motor which is especially intended for driving light-weight machinery, such for instance, as phonographs or the like, to provide a construction which will be light in weight, simple in construction, and which can be manufactured and sold at a comparatively low price.

More specifically stated, my object is to provide a spring motor which will be practically silent or noiseless in operation, and having an automatic governor incorporated therewith.

Other objects and particular advantages of the invention will suggest themselves in the course of the following description, and that which is new will be correlated in the appended claim.

The preferred means for carrying out my invention in a practical and a mechanical manner is shown in the accompanying drawings, in which—Figure 1 is a side elevation of the mechanism of the motor. Fig. 2 is a plan view, taken partly in horizontal section on the line 2—2 of Fig. 1. Fig. 3 is an end elevation, as taken from the right of Fig. 1. And Fig. 4 is a detail perspective view of the regulator hanger.

Similar indices denote like parts throughout the several views. In order that the construction, the operation, and the advantages of the invention may be more fully understood and appreciated I will now take up a detailed description thereof in which I will set forth the several features thereof as fully and as comprehensively as I may.

The body of the motor comprises a frame including the top plate 1 and the bottom plate 2, which are substantially identical with each other, and they are spaced apart by a plurality of round posts 3, 4 and 5, and by the posts 6 and 7 which are oblong in cross section. The posts 6 and 7 are arranged in line with one edge of the plates

1 and 2, as shown in Fig. 2. All of said posts are connected at each end to said plates by screws or the like, as the screws 8 for instance.

The gearing comprises the driving shaft 9 which is pivoted into the plates 1 and 2 and it carries the two spring barrels 10 and 11, each of which contains the usual driving spring. The said springs and the spring barrels are so mounted on the shaft 9 that the springs act conjointly on the shaft 9, whereby they act as a continuous spring for driving the shaft 9 for a longer time than a single spring. Integral with the periphery of the barrel 10 is the gear 12; and integral with the periphery of the barrel 11 is the gear 13. Numeral 14 denotes the intermediate shaft, which is also pivoted in the plates 1 and 2. Carried by the shaft 14 is the pinion 15 which meshes with the gear 13. Numeral 16 denotes the intermediate gear wheel which is also secured on the shaft 14. Numeral 17 denotes the driven shaft which is pivoted in the plates 1 and 2 and it extends above the plate 1 and carries on its upper end the turntable 18. Secured around the lower portion of the shaft 17 is the pinion 19 which meshes with the gear 16. Also secured around the shaft 17 is the major flanged-pulley 20 whose function will be hereinafter explained.

The governor.—The hanger for the governor is composed of a central portion 21 whose length is slightly less than the distance between the plates 1 and 2. Extending in the same direction with relation to each other from and at right-angles to the ends of the member 21 are the arms 22 and 23 which are identical with each other and each has on its free end portion a bearing 24 and 25, respectively, which are oppositely disposed with relation to each other. Also near the member 21 there are apertures 26 and 27 formed through the respective arms 22 and 23. A bolt 28 is inserted through the apertures 26 and 27 and through similar apertures in the plates 1 and 2, where it is secured, and by which the hanger may be revolved around on the bolt 28.

The governor proper comprises the shaft 29 which has its ends pivoted in the bearings 24 and 25. Rigidly secured around the lower portion of the shaft 29 is the head 30. Slidably mounted on the shaft 29 is the brake disk 31 which has a disk 32 on its upper end. Two pairs of ears 33 and 34 ex-

tend down from the brake disk 31. Pivoted between the members of said ears, and extending downward and outward, are the arms 35 and 36 respectively. Weights 37 and 38 are secured on the lower ends of the respective arms 35 and 36. Pivoted in the head 30, and extending upward and outward, with their upper ends pivoted near the central portions of the respective arms 35 and 36, are the fingers 39 and 40. Numeral 41 denotes a helical spring surrounding the shaft 29 with its upper end pressing against the plunger 31 and having its lower end secured to the shaft 29, whereby the brake disk is normally and resiliently pressed upward to its limit and away from the head 30. The brake comprises the contact 42, which is carried by the arm 43, which in turn is carried by the collar 44, the latter surrounds the post 5. Said collar is adapted to be secured at any height along said post as by the thumb screw 45, whereby the contact 42 may be secured at any distance from the disk 32 as desired. A spring 46 is attached to the hanger and to the plate 1, for instance, whereby the governor is normally swung to its limit from the pulley 20.

Numeral 47 denotes the minor pulley, the same being secured on the shaft 29, and it is in alinement with the major pulley 20. A belt 48 connects the pulleys 20 and 47, and it is prevented from getting out of place by the flanges of said pulleys.

The winding mechanism comprises a shaft 49 which is disposed horizontally through bearings therefor in the posts 6 and 7, and on the inner end of said shaft is secured the pinion 50 which meshes at right angles with the gear 12. The shaft 49 is prevented from turning in a reverse direction by the spring 51 which is coiled around the said shaft, one end of said spring being secured, as to the post 7, and the other end being unsecured whereby it may grasp said shaft when the shaft is turned in one direction.

It is apparent that by placing a crank on the projecting end of the shaft 49 and turning the same to the right that the springs in the barrels 10 and 11 will be wound in the usual manner. The tension of said springs will revolve the barrel 11 thereby rotating the pinion 15, the shaft 14, and the gear-wheel 16, the latter operating on the pinion 19 will revolve the shaft 17 which will rotate the turn-table 18 in the usual manner. Now as the turn-table speeds up it is evident that the belt 48, connecting the pulleys 20 and 47, will rotate the shaft 29. Then as the

shaft 29 speeds up it will cause the weights 37 and 38 to swing outward and apart, thereby drawing the brake disk 31 downward until the disk 32 contacts with the brake contact 42 which, manifestly, will slow up the speed, and thereby maintaining the speed constant at a predetermined rate to which the contact has been or to which it may be set as required.

By means of the belt 48 which connects the driving gear and the governor I eliminate practically all noise of operation. By reason of the means I provide for maintaining a constant speed and the means for mounting the governor I am enabled to maintain the belt at the desired degree of tension at all times.

I desire that it be understood that various changes may be made in the several details of construction from that herein shown and described without departing from the spirit of the invention, and without sacrificing any of the advantages thereof.

Having now fully shown and described my invention, what I claim and desire to secure by Letters Patent of the United States, is—

In a spring motor having a vertical driven shaft extending between an upper and a lower plate, a pulley carried by said shaft, a governor mounted between said plates and comprising a hanger pivoted between said plates, a vertical shaft pivoted in said hanger eccentrically of the pivotal connection of the hanger, a head secured on the governor shaft, a brake disk slidable on the governor shaft, arms pivoted to and extending downward from said brake disk, fingers pivoted to and extending upward from the head with their upper ends pivoted to said arms, weights secured to the lower ends of said arms, a spring normally pressing the brake disk away from the head, a disk connected to the brake disk, a relatively stationary contact with which said disk is adapted to engage, a pulley carried by the governor shaft, a belt connecting said pulleys, and a spring normally tending to swing the governor away from the driven shaft.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

WILLIAM ESTEL MERRYMAN.

Witnesses:

ROBT. W. RANDLE,
R. E. RANDLE.

SOUND AMPLIFIER FOR PHONOGRAPHS.

1,263,625 ----- H. Thimman,
Filed Sept. 7, 1915,
Patented Apr. 23, 1918.

H. THIMGAN.
SOUND AMPLIFIER FOR PHONOGRAPHS.
APPLICATION FILED SEPT. 7, 1915.

1,263,625.

Patented Apr. 23, 1918.

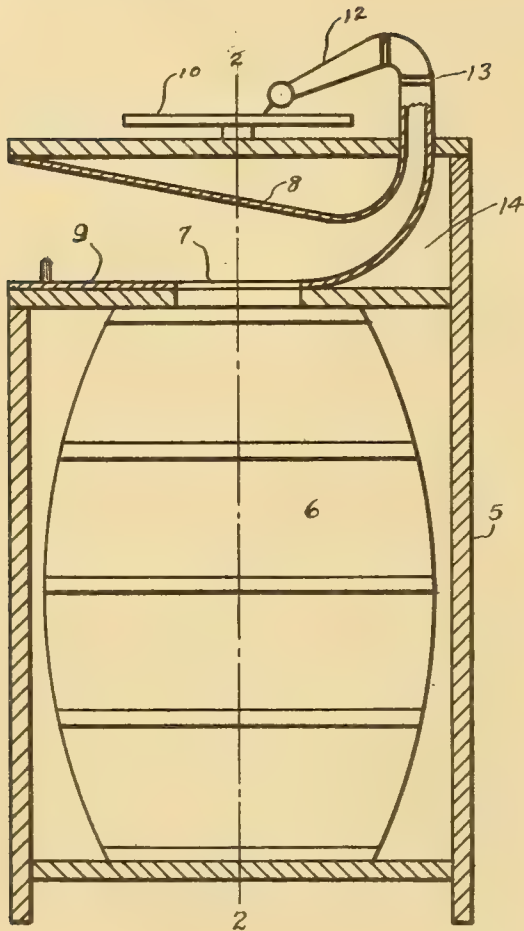


Fig 1

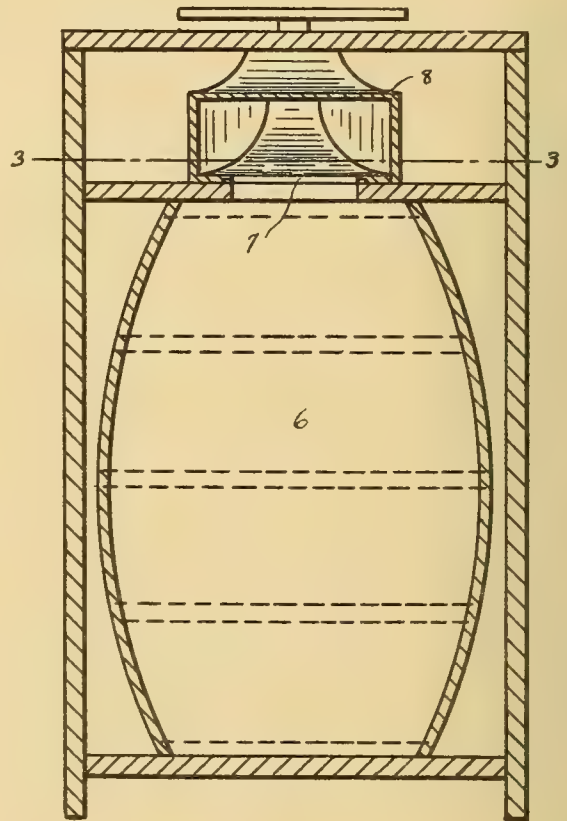


Fig 2

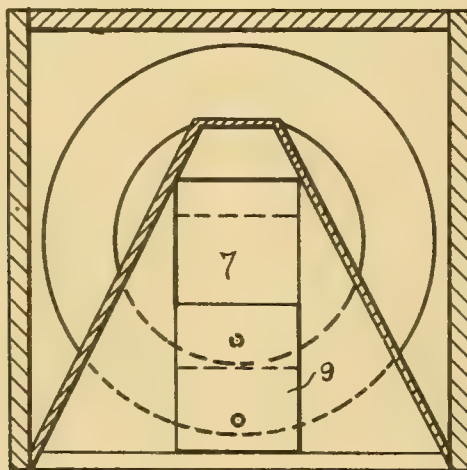


Fig 3

WITNESSES:
C. P. DENNHARDT
Pauline L. Powell

INVENTOR.
Herman Thimgan
BY *Andrew H. Wood*,
Pauline L. Powell
ATTORNEYS.

UNITED STATES PATENT OFFICE.

HERMAN THIMGAN, OF DENVER, COLORADO, ASSIGNOR TO THE COLORADO
PHONOGRAPH COMPANY, A CORPORATION OF COLORADO.

SOUND-AMPLIFIER FOR PHONOGRAPHS.

1,263,625.

Specification of Letters Patent. Patented Apr. 23, 1918.

Application filed September 7, 1915. Serial No. 49,218.

To all whom it may concern:

Be it known that I, HERMAN THIMGAN, a citizen of the United States, and a resident of the city and county of Denver, State of Colorado, have invented certain new and useful Improvements in Sound-Amplifiers for Phonographs; and I do declare the following to be a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in means which, when used in conjunction with the horn of a phonograph, will amplify the sound of the instrument, obviate the harsh, metallic sound so apparent in such instruments, and eliminate all unnatural conditions in the reproduction of the voice or sound.

Another object of my invention is to provide means of this class which will greatly improve the reproduction of sound.

With this and other objects in view, which will become apparent in the following detailed description, I will proceed to describe my invention with reference to the accompanying drawings. In these drawings, Figure 1 is an elevation view of the invention, partially in section; Fig. 2 is a longitudinal sectional view taken on the line 2—2, Fig. 1; and Fig. 3 is a cross-sectional view taken on the line 3—3, Fig. 2.

Corresponding or like parts are referred to in the following description, and indicated in all views of the accompanying drawings, by the same reference characters.

Let the numeral 5 designate a casing upon which the mechanism and construction embodying my invention is supported. Within this casing I arrange a barrel-shaped shell 6, formed of sound-proof material or other suitable material which has a tendency to reflect or amplify sound. This casing thus forms a chamber therein, and the upper extremity of the casing 6 is open, and communicates with an opening 7 formed in the lower side of the phonograph horn 8. This opening is controlled by a sliding member 9, whereby the said opening 7 may be either reduced or increased in size to govern the amplification of the sound.

The bottom wall of the sound transmitting horn 8, near the sound receiving extremity thereof, is provided with a curved portion 15, which forms a concave surface

continuing to the opening 7, whereby the sound vibrations are deflected directly through the opening 7 into the barrel-shaped shell 6.

The usual turntable 10 is provided, together with the usual arm 12; which arm 12 carries the sound diaphragm, and is journaled on the body of the horn, as shown at 13. The casing 5 is provided with an auxiliary chamber 14, in which the horn 8 is disposed.

In operation and use, the sound as reproduced by the instrument, is deflected into the casing 6, wherein it is amplified and the unnatural conditions eliminated; the amplified sound waves being then reflected out of the casing 6 and through the horn 8.

While I have described and illustrated herein a specific form of my invention, it is understood that I am not limited thereto, and that the same may be modified and varied without departing from the spirit of my invention or the scope of the appended claims.

Having thus described my invention, what I claim, and desire to secure by Letters-Patent, is:—

1. In means for modulating sound emanating from talking machines, the combination with a horn having a portion of its bottom approximately horizontally disposed and the other portion thereof curved, of a casing forming a single chamber only, said horn having a single opening only in the bottom thereof bordered on one side by the curved portion of the horn, said opening being of less area than the cross sectional area of the chamber and establishing communication between said horn and said chamber, and said opening being in axial alinement with the longitudinal axis of said chamber directly opposite the induction opening of the horn and intersected by the vertical plane of the longitudinal axis of the horn continued in a straight line from one extremity of said horn to the other.

2. In means for modulating sound emanating from talking machines, the combination with a horn having a portion of its bottom approximately horizontally disposed and the other portion of its bottom curved, the approximately horizontally disposed portion of said bottom being adjacent the discharge extremity of said horn, of a casing forming a single chamber only, said

horn having a single opening only in the bottom thereof bordered on one side by the curved portion of the horn, said curved portion of said horn merging into said opening and the greater portion of said opening being formed in the approximately horizontally disposed portion of said horn, said opening being of less area than the cross sectional area of the chamber and establishing communication between said horn and said chamber, and said opening being in axial alinement with the longitudinal axis of said chamber directly opposite the induction opening of the horn and intersected by the vertical plane of the longitudinal axis of the horn continued in a straight line from one extremity of said horn to the other.

3. In means for modulating sounds emanating from talking machines, the combination with a horn having its induction and eduction ports at the remote extremities of

the horn, of a casing forming a single chamber only, said horn having a single opening only in the bottom thereof between the induction and eduction points of said horn, the bottom of said horn being curved between said opening and the induction point of said horn and one side of said opening bordering on said curved portion of the horn, and said opening being in axial alinement with the longitudinal axis of said chamber directly opposite the induction point of the horn and intersected by the vertical plane of the longitudinal axis of the horn continued in a straight line from the induction point of said horn to the eduction point thereof.

In testimony whereof, I affix my signature in the presence of two witnesses.

HERMAN THIMGAN.

Witnesses:

H. B. Ross,

JNO. G. POWELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND REPRODUCING MACHINE.

1,263,816 ----- D. L. Suiter,
Filed Oct. 24, 1916,
Patented Apr. 23, 1918.

D. L. SUITER.
SOUND REPRODUCING MACHINE.
APPLICATION FILED OCT. 24, 1916.

1,263,816.

Patented Apr. 23, 1918.
2 SHEETS—SHEET 1.

FIG. 1.

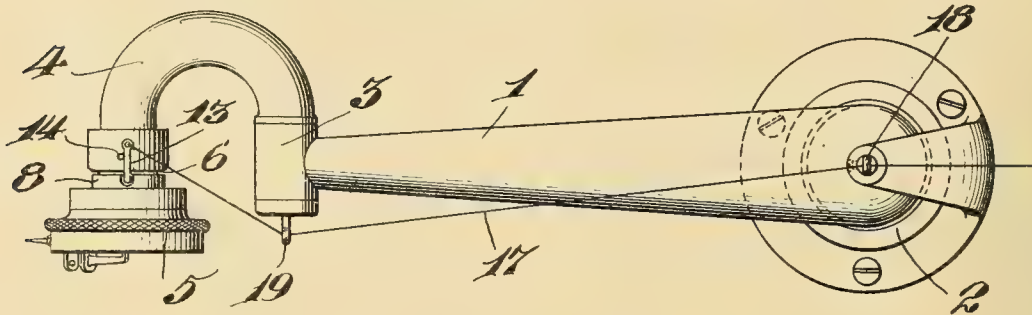


FIG. 2.

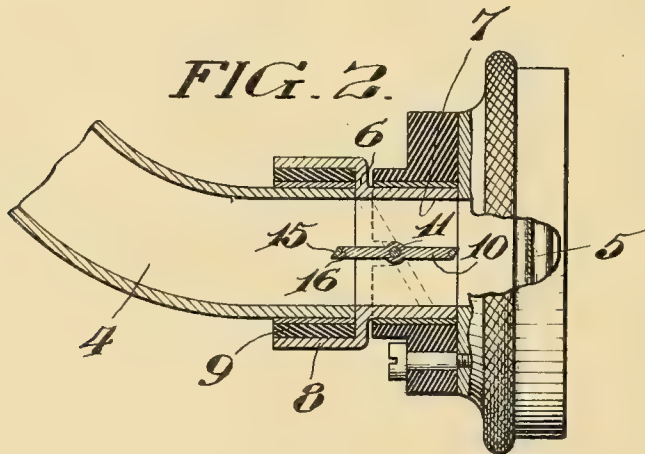
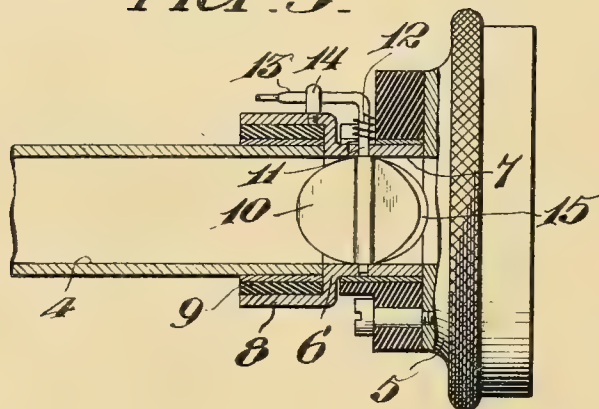


FIG. 3.



Inventor

David L. Suiter

Witness

Wm. C. Suiter

By

Foster and Webster

his Attorneys

D. L. SUITER.
SOUND REPRODUCING MACHINE.
APPLICATION FILED OCT. 24, 1916.

1,263,816.

Patented Apr. 23, 1918.
2 SHEETS—SHEET 2.

FIG. 4.

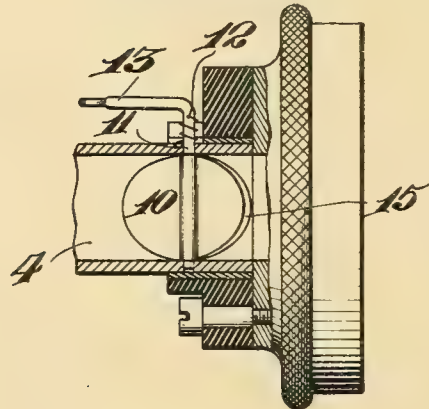


FIG. 5.

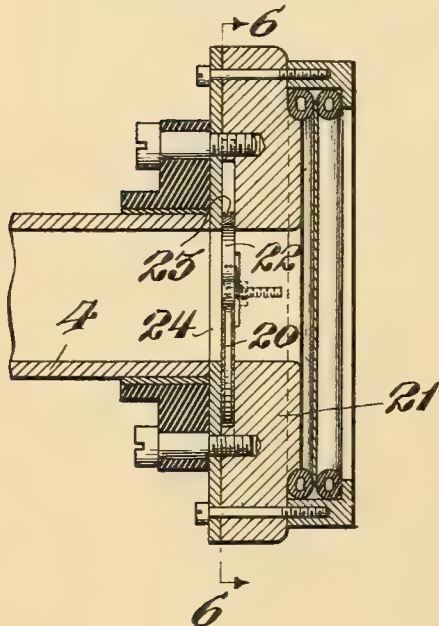


FIG. 6.

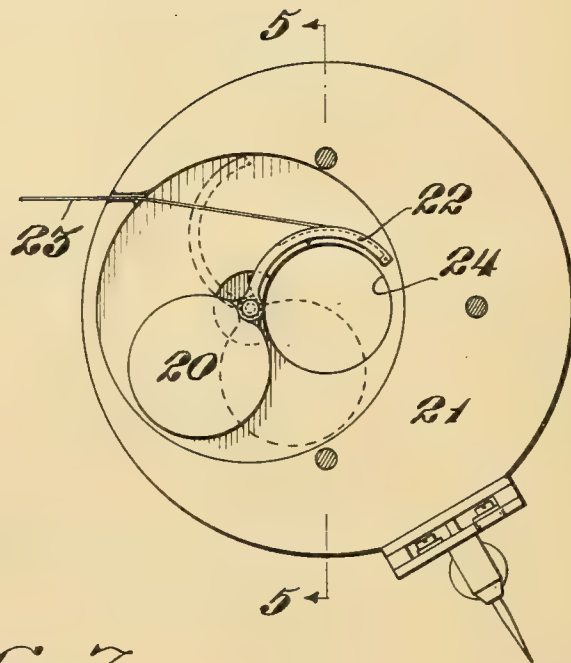
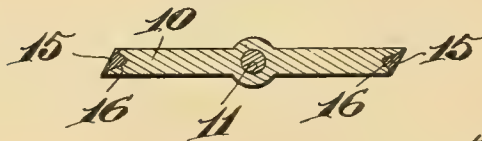


FIG. 7.



Inventor

David L. Suiter

Witness

Wm. Conway.

By

Foster and Webster
his Attorneys

UNITED STATES PATENT OFFICE.

DAVID L. SUITER, OF PHILADELPHIA, PENNSYLVANIA.

SOUND-REPRODUCING MACHINE.

1,263,816.

Specification of Letters Patent.

Patented Apr. 23, 1918.

Application filed October 24, 1916. Serial No. 127,393.

To all whom it may concern:

Be it known that I, DAVID L. SUITER, a citizen of the United States, residing at Olney, Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Sound-Reproducing Machines, of which the following is a specification.

My invention relates to improvements in sound reproducing machines, an object of the invention being to provide improved means for modifying or restraining the sound waves during the operation of the device so as to bring out the desired expression, and to control the volume of sound by manually operated means without interfering with the ordinary functions of the device.

Heretofore, various attempts have been made to control the volume of sound, but I believe such devices have been defective, largely, because of the fact that the controlling device or damper is located too far away from the diaphragm so that the sound waves are thrown backwardly, causing a confusion of sound and therefore interfering rather than aiding in the proper reproduction.

With my improvements, I locate the damper as close to the diaphragm as possible so that the control of the sound waves is had before any appreciable volume of air is in motion toward the outlet.

A further object is to provide an improved construction of damper or valve which can be readily operated to perform the functions for which it is intended.

With these and other objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings:
Figure 1 is a top plan view illustrating a preferred form of my invention.

Fig. 2 is a view in longitudinal section, partly in elevation showing my improved damper located in a coupling connecting the sound box with the sound tube.

Fig. 3 is a view in longitudinal section taken at right angles to Fig. 2.

Fig. 4 is a view similar to Fig. 3 illustrating a modification in which the damper

is in the sound tube and the coupling is dispensed with.

Fig. 5 is a view in longitudinal section illustrating a modification in which the damper is located entirely in the sound box.

Fig. 6 is a view in section on the line 6—6 of Fig. 5, and

Fig. 7 is an enlarged view in section illustrating the butter-fly valve or damper shown in Fig. 2.

1 represents a tone-arm pivotally supported at one end in a collar 2 and at its free end provided with a sleeve 3 in which a sound tube 4 has rotary mounting, and 5 is the sound box supported at the free end of the tube 4.

The parts above described are the ordinary construction in general use, and need not be described in detail.

6 represents a coupling which is of tubular form and of two diameters. The smaller end 7 of the coupling 6 projects into the sound box 3, while the larger end 8 fits around the outside of the tube 4 and is preferably provided with a rubber or other non-conducting gasket 9. A butter-fly valve 10 is secured on a shaft 11 which projects through coupling 6, and spring 12 on the outer end of the shaft normally holds the valve in open position with a crank arm 13 on the end of the shaft against the stop 14 on the outside of the coupling.

The valve 10 is provided at its periphery with a coating or covering of soft material 15, preferably Babbitt-metal which may be anchored to the valve in various ways.

I have shown the valve as provided with a groove 16 into which the Babbitt-metal is anchored. I may resort to other means for anchoring the Babbitt-metal.

A flexible device 17 which may constitute a cord, wire, or other device is secured at one end to the crank arm 13 and is passed through a guide 18 at the center or axis of the pivotal connection 2 of tone-arm 1 so that when the flexible device is pulled the valve 10 will be turned without exerting any pressure on the tone-arm or on the other working parts to effect the playing of the instrument, hence the control of the valve can be had at all positions of the sound box on the record with equally efficient results.

The flexible device 17 is passed through a guide 19 on the end of the tube 4, where

it connects with the tone-arm 1, so as to prevent any tendency to elevate the sound box when the flexible device is pulled.

It is of course, to be understood that the flexible device may be operated from a distance, and I may utilize various forms of attachment and connections for the purpose.

In the modification shown in Fig. 4, the valve 10 is located in the sound tube 4 and the coupling is dispensed with, but in other respects the construction is the same as in the preferred form.

In Figs. 5 and 6, I illustrate a modification in which the valve or damper 20 is located inside of sound box 21. This valve 20 is spring-held in open position and is provided with a curved arm 22 to which a cord 23 is connected so that when the cord is pulled the valve or damper is moved across, or partially across, an opening 24 to control the sound waves.

As my improved device operates as a damper to hold back the sound waves and reduce or soften the tone, I shall hereinafter refer to the controlling device as a damper, and I would have it understood that while I have illustrated various forms of damper, I do not limit myself in this respect but may utilize any form which is capable of the functions intended.

I believe, however, that a butter-fly valve of the construction shown is a preferable form, and I believe it is advisable to locate the butter-fly valve as close to the diaphragm as practicable.

Various slight changes may be made in the general form and arrangements of parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A sound reproducing machine, com-

prising a pivoted tone arm having a guide on its upper face in line with the axis about which it is pivoted, a sound box carried by the tone arm, a damper located in the sound passage, and a flexible device outside of the tone arm and box, said device adapted to operate the damper and supported in said guide.

2. A sound reproducing machine, comprising a tone-arm pivoted at one end, a sound tube connected to the other end of the tone-arm, a sound box carried by the tube, a damper located in proximity to the sound box, a guide in line with the axis about which the tone-arm is pivoted, and a flexible device outside of the tone arm and passing through said guide and connected to the damper.

3. A sound reproducing machine, comprising a pivoted tone-arm, a sound tube having rotary mounting at the free end of the tone-arm, a sound box carried by the tube, a damper in the sound passage adjacent the diaphragm of the sound box, a flexible operating device connected to the damper, and guides for said flexible device in line with the axis about which the tone-arm is pivoted and with the axis about which the sound box turns, respectively.

4. A sound reproducing machine, comprising a pivoted tone-arm, a sound tube connected to the tone-arm, a sound box, a coupling connecting the sound box and the tube, a butter-fly valve in the coupling, a crank shaft secured to the valve and having a crank arm outside the coupling, and a flexible connecting device connected to the arm and having a guide in line with the axis about which the tone-arm is pivoted.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID L. SUITER.

Witnesses:

ELEANOR F. MURRAY,
WILLIAM CONWAY.

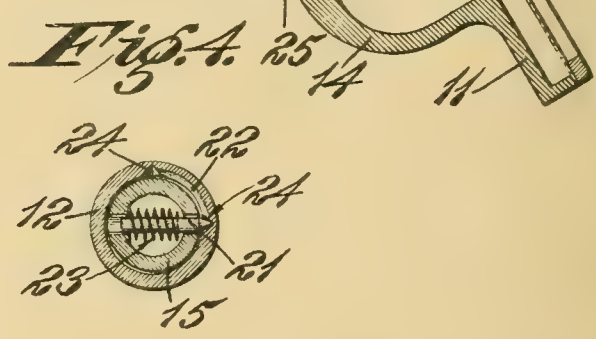
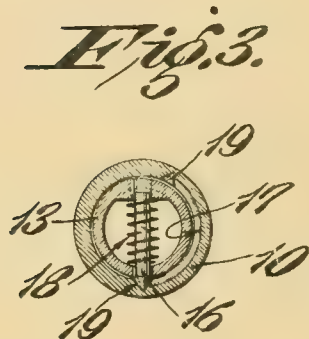
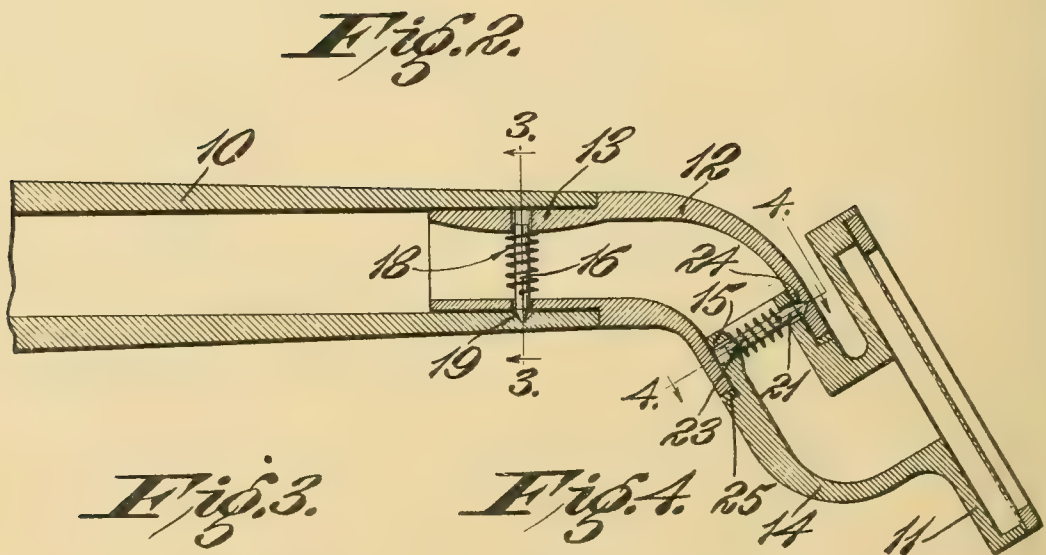
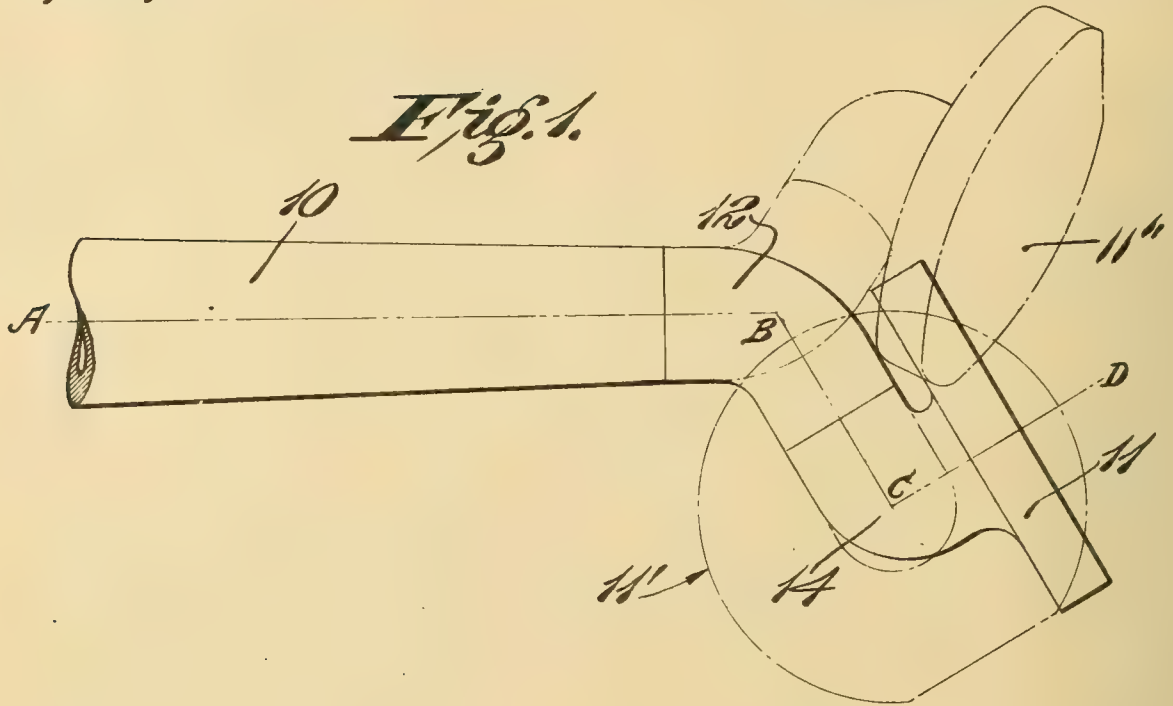
TONE-ARM FOR PHONOGRAPHS.

1,264,017 ----- R. H. Cone, Jr.,
Filed June 29, 1916,
Patented April 23, 1918.

R. H. CONE, JR.
TONE ARM FOR PHONOGRAPHS.
APPLICATION FILED JUNE 29, 1916.

1,264,017.

Patented Apr. 23, 1918.



Witnesses:
Edgar S. Farmer.
Amstutz & Co.

Inventor:
Robert H. Cone, Jr.,
by Carver & Carver,
his Attys.

UNITED STATES PATENT OFFICE.

ROBERT H. CONE, JR., OF ST. LOUIS, MISSOURI.

1 TONE-ARM FOR PHONOGRAPHS.

1,264,017.

Specification of Letters Patent.

Patented Apr. 23, 1918.

Application filed June 29, 1916. Serial No. 106,557.

To all whom it may concern:

Be it known that I, ROBERT H. CONE, JR., a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Tone-Arms for Phonographs, of which the following is a specification.

This invention relates to phonographs of the disk type, and its object is to enable both records having vertical undulations and those having transverse undulations to be played by the same instrument.

The invention consists in an arrangement of sound box and tone arm, and a joint connection between the sound box and the tone arm for enabling the sound box to be set in either of two positions at right angles to each other. The invention further consists in a joint connection between the sound box and tone arm permitting the sound box to be turned up off of the record and out of the way. The invention also consists in a joint connection for holding securely the sound box in either of two positions of adjustment, and which permits changing from one position to the other by merely twisting the sound box with the hand.

Further details of the invention and what it consists in appear in connection with the device shown in the drawings, as hereinafter described and claimed.

In the drawings, wherein the same reference characters designate the same parts in the several views,

Figure 1 is a side elevation of a tone arm and sound box embodying the invention, showing the sound box in position for playing records having vertical undulations;

Fig. 2 is a longitudinal section of the same in a vertical plane through the axis of the tone arm;

Fig. 3 is a cross-section on the tone arm on the line 3—3 in Fig. 2; and

Fig. 4 is a cross-section of the elbow portion of the tone arm, on the line 4—4 in Fig. 2.

The sound box is shown in dot and dash lines in Fig. 1 in position for playing records having lateral undulations; and it is also shown in dot and dash lines in Fig. 1 thrown up away from the record.

The tone arm 10 is mounted at one end (not shown) for both horizontal and vertical swinging movement whereby its other end, which supports the sound box 11 and stylus (not shown), is free to move to per-

mit the stylus to be supported in and to follow the groove of the record. The axis AB of the tone arm is normally horizontal (as shown in Fig. 1), and the vertical swinging movement of the arm is slight and is restricted by suitable stops (not shown) which maintain the arm substantially horizontal when the sound box is turned up and the stylus is off of the record.

The free end of the tone arm has an elbow 12, one branch of which has a reduced extension 13 which is rotatably secured within the end of the tone arm, and the other branch of which normally projects down at an angle of about sixty degrees to the horizontal, on the axis BC in Fig. 1. The sound box has a hollow stem 14 which makes a right angle turn at the back of the sound box and its end 15 is reduced and is rotatably secured within the angularly projecting branch of the elbow 12. By this arrangement the axis CD of the sound box makes an angle of about thirty degrees with the horizontal in the position shown in full lines in Fig. 1, and the sound box may be turned on the axis BC of the stem until the axis CD is parallel to the horizontal, as shown at 11' in dot and dash lines in Fig. 1. The sound box may also be turned up to lift the stylus off of the record by swinging the elbow 12 around on the horizontal axis AB, as shown at 11'' in dot and dash lines in Fig. 1.

The end 13 of the elbow 12 is held in adjusted position in the end of the tone arm by means of a detent pin 16 which is slidably arranged in a transverse hole through the end of the elbow with one end projecting from the hole and engaging in a circumferential groove 17 in the inner wall of the tone arm. The pin 16 is yieldingly held in place with its point in the groove by means of a small spring 18. The groove 17 extends around the inside of the tone arm through an angle of about one-hundred and fifty degrees, and terminates at each end in depressions 19 for the point of the pin to catch in. The depressions 19 at the ends of the groove 17 are so located as to hold the elbow secured in either of its desired positions. The sides of the depressions 19 are slanting so the pin 16 can slide out and the elbow may be turned from one position to the other without difficulty.

The end 15 of the stem 14 of the sound box is held in adjusted position in the end

of the elbow by a detent 21 which is slidably arranged in a transverse hole through the end of the stem with one end projecting from the hole and engaging in a circumferential groove 22 in the inner wall of the elbow. The pin 21 is yieldingly held in place with its point in the groove by means of a small spring 23. The groove 22 extends around the inside of the elbow through an angle of ninety degrees, and terminates at each end in depressions 24 for the point of the pin to catch in. The depressions 24 are so located as to hold the sound box securely in either of its two positions of adjustment, and the shape of the depressions is such that the sound box may be turned from one adjusted position to the other at right angles thereto without difficulty. A rubber washer 25 is inserted between the end of the elbow and the shoulder at the junction of the end 15 and the stem of the sound box. Moreover, the sound box may be removed by merely pulling its stem out of the end of the sleeve, the pin 20 having sufficient movement to permit it to be pressed into its hole out of engagement with the groove 21. Likewise, the elbow 11 may be removed from the tone arm 10 by merely pulling it out.

The joints between the tone arm, the elbow, and the sound box are smooth and neat looking on the outside and the obstruction which they constitute to the transmission of sound within the tone arm is slight. The construction also permits the sound box and stem to be cast in one piece, thereby reducing liability of vibration from looseness of the parts. The invention is not restricted to the precise details of construction shown and described.

I claim the following as my invention:

1. A tone arm for a phonograph having an elbow at its free end, said elbow having an extension projecting into the end of the tone arm, a circumferential groove on the

inside of the tone arm outside of and partly encircling said extension, a depression at each end of said groove, said extension having alining transverse holes in its opposite walls, and a pin slidably mounted in said transverse holes and guided in both walls of said extension and having one end projecting therefrom and resilient means for engaging said pin in one or the other of said depressions, thereby holding said elbow in its corresponding angular position.

2. A tone arm for a phonograph having an elbow at its free end, said elbow having an extension projecting into the end of the tone arm, a circumferential groove on the inside of the tone arm outside of and partly encircling said extension, said extension having alining transverse holes in its opposite walls and a pin slidably mounted in said transverse holes and guided in both walls of said extension, and having one end projecting therefrom and engaging in said groove, and a spring pressing the end of said pin in said groove to hold said elbow in position.

3. A tone arm for a phonograph having a sound box loosely arranged upon its free end, said sound box having an extension projecting into the end of the tone arm, a circumferential groove on the inside of the tone arm outside of and partly encircling said extension, and a pin slidably mounted at its ends in a transverse hole in said extension and having one end projecting therefrom and engaging in said groove, the walls of said groove being inclined and said pin having a tapered point adapted to seat in said groove to hold said sound box in position, and a spring for releasably holding said pin in said groove whereby said sound box may be removed.

Signed at St. Louis, Missouri, this 27th day of June, 1916.

ROBERT H. CONE, JR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

SOUND BOX.

1,264,201 ----- L. Menge,
Filed Apr. 7, 1916,
Patented Apr. 30, 1918.

L. MENGE.
SOUND BOX.
APPLICATION FILED APR. 7, 1916.

1,264,201.

Patented Apr. 30, 1918.

Fig. 1

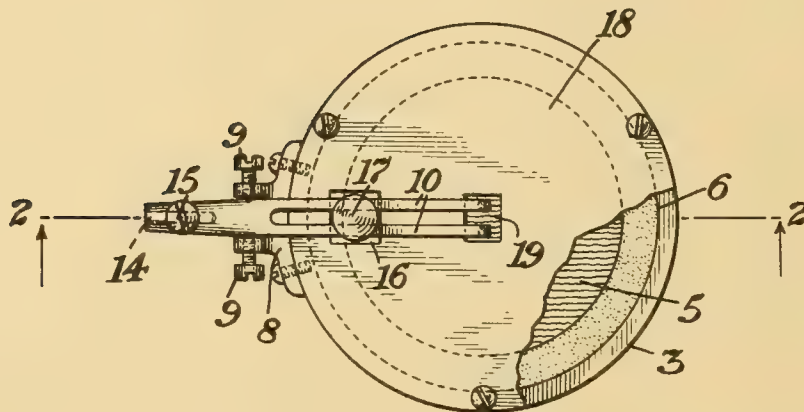
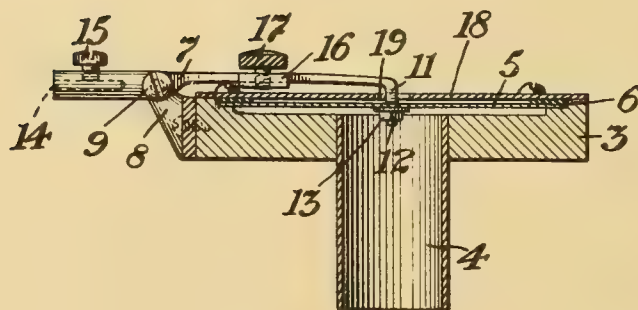


Fig. 2



WITNESS

Chas. J. Claggett

INVENTOR

Louis Menge

BY *W. S. Oston*
ATTORNEY

UNITED STATES PATENT OFFICE.

LOUIS MENGE, OF EAST ORANGE, NEW JERSEY.

SOUND-BOX.

1,264,201.

Specification of Letters Patent. Patented Apr. 30, 1918.

Application filed April 7, 1916. Serial No. 89,704.

To all whom it may concern:

Be it known that I, LOUIS MENGE, a citizen of the United States, residing at East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Sound-Boxes, of which the following is a specification.

My invention relates in general to sound transmitting mechanisms and specifically relates to improvements in recording and reproducing sound boxes for gramophones, phonographs, and like machines which employ a vibratory diaphragm in connection with a stylus arm or lever operatively associated with the diaphragm to transmit motion to and from the same.

It is well known in the phonographic trade at present that different types of sound boxes now on the market respond differently to the different characters of records used. For instance, a machine using one form of sound box gives the most pleasing effect when used with a record having high vibratory notes, such as a violin record; while another form of sound box responds best to some other character of record such as a vocal record. It is generally true that each sound box works best with only one or possibly two similar types of records. Under these conditions an obvious objection to the known types of sound boxes now in general use is that they are not susceptible of giving uniformly good results with the different forms of records and accordingly one of the objects of my invention is to provide a sound box capable of being quickly adjusted to best suit the particular character of playing record in use.

Most of the sound boxes now in general use appear to reproduce, superimpose, and rather emphasize the overtones on the record and perceptibly reproduce the high pitch foreign noises resulting in the squeaking so objectionable in phonographic devices. Another object of my invention is to minimize this sharp note effect and to provide a sound box which while accurately reproducing the basic sounds originally produced on the record, at the same time will mellow the reproduced tones so as to give a rich, full timbre without depriving the tones of their full musical note values.

I attain this latter object broadly by providing a very thin and sensitive vibratory diaphragm formed from a specially adapted

wood and by securing to the diaphragm one end of a relatively light and delicately pivoted stylus arm the other end of which arm is designed to have a playing stylus operatively mounted therein. As a further refinement in the stylus arm feature of my invention, I construct the same from a relatively small tuning fork, the free ends of the prongs of which are fixed to the diaphragm transversely of the line of grain therein.

Various other objects and advantages of the invention will be in part obvious from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one form of mechanism embodying my invention, and the invention also consists in certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the drawings:

Figure 1 is a face view shown in plan of a sound box illustrating a preferred form of my invention; and

Fig. 2 is a central sectional view taken approximately on the line 2—2 of Fig. 1.

The sound box comprises a flat cylindrical casing 3, preferably of metal, provided with the usual tubular extension 4, extending from the rear face of the diaphragm 5, through the casing. One face of the casing is recessed to provide an annular shoulder 6 for supporting the vibratory diaphragm at its outer edge. It is essential to the best results that the diaphragm be of light weight compared to its area and as herein shown, this diaphragm is in the form of a thin, flat, fine-grained, wooden disk, preferably with the grain even and extending in one general direction. An excellent form of diaphragm for this purpose has been formed of well seasoned spruce treated with a thin shellac, allowed to dry slowly and sand-papered to a thickness of about one hundredth of an inch, but a diaphragm of less thickness is preferable, provided, however, that it have a thickness sufficient to insure a rapid elasticity.

A stylus arm 7, is pivoted intermediate its length to a bracket 8, demountably affixed to the periphery of the casing 3 and arranged to swing about an axis parallel to the plane of the diaphragm, as is usual with devices of this character. The pivotal connection, however, in this case is

preferably anti-friction, screw-pivots 9 engaging opposite sides of the arm so as to offer the least possible resistance to the rocking movement of the arm has been found to be entirely satisfactory. The arm is in the form of a tuning fork with a pair of prongs 10 of uniform rectangular cross-section and preferably having a length sufficient to reach from the point of attachment to the diaphragm to a point beyond its periphery and positioned entirely on one side of the diaphragm. The free ends of the prongs have a right angled offset extension 11 reduced to form a pin 12 passed through suitable pin holes in the diaphragm and fastened in position by a retaining nut 13 designed to clamp the diaphragm between the same and a shoulder on the extension. It has been found advantageous to form the arm of rolled steel and to cut away part of the prongs so as to leave the extension 11 as an integral projection from the end of the prongs. The prongs are fastened to the diaphragm transversely of the line of grain therein and preferably the arm extends either parallel to the plane of the diaphragm and to the line of grain or at a slight angle thereto.

The outer or stem end of the arm is provided with a stylus socket 14 designed to mount any of the conventional playing styli which are held in position by the binding screw 15.

A dampening device 16 is slidably mounted upon the prongs for movement to and from the point of attachment of the prongs with the diaphragm. As herein shown the dampening device is in the form of a bridge, channel shape in section and mounted free to swing with the prongs without being influenced by any other member. The bridge is positioned on the underside of the arm with the prongs positioned in the channel. A set screw 17 is threaded into the bridge between the prongs and is provided with a head of sufficient diameter to overlap the prongs and to act thereon to draw the bridge into binding engagement with the prongs at any place along their lengths.

The diaphragm is held in place by means of a cover plate 18, preferably of metal, and fastened in position by screws passed therethrough and into the casing adjacent its periphery. The cover plate 18 is provided with a centrally positioned aperture 19 designed to permit the intuned extensions 11 to pass therethrough into engagement with the diaphragm. While the cover plate does not appear to be a vital feature of the invention, still when it is used, the diaphragm is inclosed between sound reflecting surfaces and this organization appears to assist materially in producing the rich mellow tones desired.

In operation it is understood that this sound box is mounted in position, and that a playing needle or stylus is positioned in the socket 14 all as is usual with devices of this character. The dampening device is shifted along the length of the stylus arm into the position which will give the most agreeable tones to the auditor. It will be found that the closer the dampening device is moved toward the points of attachment of the same with the diaphragm, the softer and more mellow will the tune become, and that as the dampening device is moved toward the stylus a louder and more raucous note is produced. The operator will soon become skilled in anticipating just where the dampening device should be placed to obtain the most perfected results with the particular character of disk operated upon and even with the same disk different tone quantities may be anticipated and produced.

The dampening device in its different positions seems to change the transmitting character of the stylus arm and it is at present believed that each prong is effected by the portion of the diaphragm to which it is attached independently of the movement of the other prong and that the shifting of the dampening device in effect is equivalent to lengthening or shortening the stylus arm either as a whole or possibly only the light portions constituting the prongs.

While the use of a wooden diaphragm is admittedly not new, still the combination of a wooden diaphragm with a tuning-fork-type of stylus tone produces a rich mellow tone having the peculiar timbre effect that is produced by an old violin. Further this mellow wood tone is graduated conveniently by the dampening device so that the peculiar association of wooden diaphragm, tuning fork, stylus arm and freely swinging dampening bridge has produced an improved form of sound box capable of functions not heretofore possible.

While I have shown and described, and have pointed out in the annexed claims, certain novel features of my invention, it will be understood that various omissions, substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. In a sound box, the combination with a wooden vibratory diaphragm having the grain thereof extending in one direction, a stylus arm having two prongs integrally connected, the free ends of said prongs being fixed to the diaphragm on opposite sides of one of the grain lines and said arm provided with means for mounting a playing stylus.

2. In a sound box, the combination with a wooden vibratory diaphragm having the grain thereof extending in one direction, a stylus arm having two prongs integrally
5 connected, the free ends of said prongs being fixed to the diaphragm transversely of the direction of the lines of the grain.

3. In a sound box, the combination with a vibratory diaphragm, of a stylus arm in
10 operative engagement with the diaphragm to actuate the same and a diaphragm dampening device carried by the arm free to vibrate therewith and shiftable thereon to and from the point of engagement of the
15 arm with the diaphragm, said dampening device being rigid thereby to stiffen the portion of the arm engaged thereby.

4. In a sound box, the combination with a vibratory diaphragm, of a stylus arm in
20 operative engagement with the diaphragm to actuate the same and a diaphragm dampening device in the form of a channel member with the arm slidably positioned in the channel and free to vibrate therewith, shift-
25 able thereon to and from the point of engagement of the arm with the diaphragm said device including means for locking the same in set position on the arm.

5. In a sound-box, the combination with
30 a vibratory diaphragm and a stylus arm provided with two prongs associated with the diaphragm, a bridge free to vibrate with the stylus arm connecting the prongs, the bridge being slidable to and from the dia-
35 phragm thereby to effect the normal free swing of the diaphragm.

6. In a sound box, the combination with a vibratory diaphragm, and a stylus arm provided with a plurality of prongs opera-
40 tively associated with the diaphragm and means shiftable along the length of the prongs for varying the length of the portion of the prongs in advance of said shiftable means which engage the diaphragm and

which have relatively independent move- 45
ment.

7. In a sound box, the combination with a vibratory diaphragm and a stylus arm in the form of a tuning fork, the free ends of the prongs of said fork being in operative
50 engagement with the diaphragm to transmit vibratory motion and means shiftable along the length of the prongs for holding the prongs against relative movement and for affecting the prong lengths of said tuning-
55 fork stylus arm which have relatively independent movement.

8. The method of regulating the reproduction of sound from a sound box, which consists in engaging a regulating mass with
60 the needle arm of said sound box between its point of connection with the diaphragm and its point of connection with the sound box frame, said mass being rigid and extending along the arm for some material
65 distance and moving said regulating mass to and fro along said needle arm between its said points of connection to effect the reproduction desired.

9. In a sound box, the combination with
70 a light wooden vibratory diaphragm having the grain thereof extending in one direction, and a stylus arm having two prongs integrally connected, the free ends of said prongs being fixed to the diaphragm trans-
75 versely of the direction of the lines of the grain.

10. In a sound box, the combination with a light wooden vibratory diaphragm having the grain thereof extending in one direction,
80 a stylus arm having two prongs integrally connected, the free ends of said prongs being fixed to the diaphragm transversely of the direction of the lines of the grain.

Signed at Newark in the county of Essex 85
and State of N. J., this 5th day of April,
A. D., 1916.

LOUIS MENGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

1. The first of these is the fact that the system is not a simple one, but a complex one, involving many different factors, and the results of which are not always predictable.
2. The second is the fact that the system is not a static one, but a dynamic one, and the results of which are not always predictable.
3. The third is the fact that the system is not a linear one, but a non-linear one, and the results of which are not always predictable.
4. The fourth is the fact that the system is not a homogeneous one, but a heterogeneous one, and the results of which are not always predictable.
5. The fifth is the fact that the system is not a uniform one, but a non-uniform one, and the results of which are not always predictable.
6. The sixth is the fact that the system is not a continuous one, but a discontinuous one, and the results of which are not always predictable.
7. The seventh is the fact that the system is not a smooth one, but a non-smooth one, and the results of which are not always predictable.
8. The eighth is the fact that the system is not a regular one, but an irregular one, and the results of which are not always predictable.
9. The ninth is the fact that the system is not a periodic one, but an aperiodic one, and the results of which are not always predictable.
10. The tenth is the fact that the system is not a bounded one, but an unbounded one, and the results of which are not always predictable.
11. The eleventh is the fact that the system is not a closed one, but an open one, and the results of which are not always predictable.
12. The twelfth is the fact that the system is not a finite one, but an infinite one, and the results of which are not always predictable.
13. The thirteenth is the fact that the system is not a discrete one, but a continuous one, and the results of which are not always predictable.
14. The fourteenth is the fact that the system is not a countable one, but an uncountable one, and the results of which are not always predictable.
15. The fifteenth is the fact that the system is not a measurable one, but a non-measurable one, and the results of which are not always predictable.
16. The sixteenth is the fact that the system is not a separable one, but a non-separable one, and the results of which are not always predictable.
17. The seventeenth is the fact that the system is not a complete one, but an incomplete one, and the results of which are not always predictable.
18. The eighteenth is the fact that the system is not a compact one, but a non-compact one, and the results of which are not always predictable.
19. The nineteenth is the fact that the system is not a connected one, but a disconnected one, and the results of which are not always predictable.
20. The twentieth is the fact that the system is not a path-connected one, but a non-path-connected one, and the results of which are not always predictable.
21. The twenty-first is the fact that the system is not a simply connected one, but a non-simply connected one, and the results of which are not always predictable.
22. The twenty-second is the fact that the system is not a contractible one, but a non-contractible one, and the results of which are not always predictable.
23. The twenty-third is the fact that the system is not a deformation retract one, but a non-deformation retract one, and the results of which are not always predictable.
24. The twenty-fourth is the fact that the system is not a homotopy equivalent one, but a non-homotopy equivalent one, and the results of which are not always predictable.
25. The twenty-fifth is the fact that the system is not a homeomorphic one, but a non-homeomorphic one, and the results of which are not always predictable.
26. The twenty-sixth is the fact that the system is not a diffeomorphic one, but a non-diffeomorphic one, and the results of which are not always predictable.
27. The twenty-seventh is the fact that the system is not a bijective one, but a non-bijective one, and the results of which are not always predictable.
28. The twenty-eighth is the fact that the system is not a surjective one, but a non-surjective one, and the results of which are not always predictable.
29. The twenty-ninth is the fact that the system is not an injective one, but a non-injective one, and the results of which are not always predictable.
30. The thirtieth is the fact that the system is not a bijective one, but a non-bijective one, and the results of which are not always predictable.

APPENDIX

THE FOLLOWING TABLES GIVE THE RESULTS OF THE CALCULATIONS FOR THE FIRST TEN TERMS OF THE SERIES.

SOUND REPRODUCING DIAPHRAGM AND PROCESS
OF MAKING THE SAME.

1,264,219 ----- J. A. Steurer,
Filed Dec. 17, 1917,
Patented Apr. 30, 1918.

J. A. STEURER.
SOUND REPRODUCING DIAPHRAGM AND PROCESS OF MAKING THE SAME.
APPLICATION FILED DEC. 17, 1917.

1,264,219.

Patented Apr. 30, 1918.

Fig: 1.

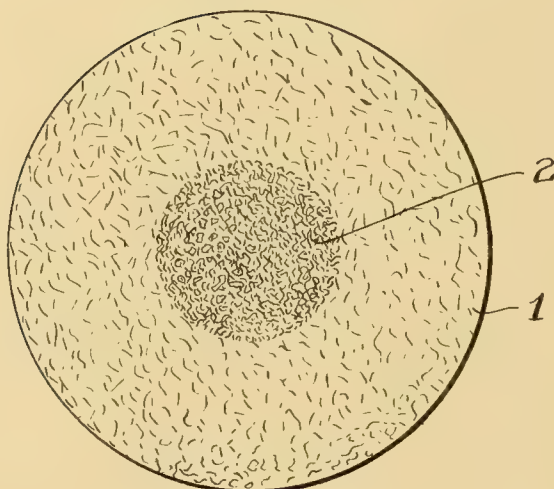


Fig: 2.



John A. Steurer INVENTOR
BY Whitaker & Brewster ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN A. STEURER, OF NEW YORK, N. Y.

SOUND-REPRODUCING DIAPHRAGM AND PROCESS OF MAKING THE SAME.

1,264,219.

Specification of Letters Patent.

Patented Apr. 30, 1918.

Application filed December 17, 1917. Serial No. 207,446.

To all whom it may concern:

Be it known that I, JOHN A. STEURER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Sound-Reproducing Diaphragms and Processes of Making the Same; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention consists in the novel features hereinafter described, reference being had to the accompanying drawing which illustrates one embodiment of the invention selected by me for purposes of illustration, and the said invention is fully disclosed in the following description and claims:

In my former Patent, #1,192,833, dated July 25th, 1916, I have described and claimed a clarifying disk composed of a phenolic condensation product having embodied therein strata of fibrous material parallel with the diaphragm, adhesively secured to the central portion of the diaphragm for the purpose of eliminating metallic resonance and clarifying the tone produced by the diaphragm. The material which I have preferably used for these clarifying disks is bakelite dilecto, and the results obtained have been eminently satisfactory, so far as the tone was concerned. I have experienced, however, some difficulty with the use of this type of diaphragm on account of the fact that if the cementing of the disk is not most carefully done, they in some instances tend to cleave away from the diaphragm. One of the objects of my present invention is to form a clarifying disk for the same purpose as above set forth, which shall be an integral part of the diaphragm itself, and which therefore cannot possibly be affected in its use. In carrying out my invention, I take a sheet of thin, porous material, such as wood, veneer, blotting paper, or other material, as a base, and impregnate it with a solution material which in its final state will become hard, tough and elastic, without becoming brittle. I then treat a central, circular portion of the diaphragm so as to impregnate it more thoroughly than the surrounding portions, thereby increasing the density of the central circular portion and forming a sound clarifying disk as an integral part of the diaphragm itself. I pre-

fer to use as a base a sheet of material of fibrous character in which the fibers are in what may be termed a felted condition, and the material which I prefer to use is blotting paper. In carrying out my improved process, according to one form thereof for example, I saturate a single thickness of blotting paper with a thin solution of a phenolic condensation product, such as bakelite or condensite, dissolved in a suitable vehicle, and dry the same. The individual diaphragms may be formed either before or after the treatment of the blotting paper with the phenolic condensation product. I then treat a circular central portion, of any desired diameter, of the diaphragm with a greater amount of the solution of said condensation product, which in this instance may be either in the same or a thicker solution, and permit the central portion to dry. The central portion will therefore have taken up a much larger quantity of the condensation product than the surrounding portions and will be consequently much more dense. The diaphragm is now baked for such a time and at such a temperature as will convert the phenolic condensation product into a hard, tough, elastic condition, without being brittle. I have found that a temperature of substantially 200° Fahrenheit is best adapted for producing this condition.

A diaphragm formed as herein described thus comprises a single flat sheet of uniform thickness and composed of the same materials throughout, while having the central circular portion of greater density, forming an integral sound clarifying disk in which there is a greater proportion of the elastic, hard and tough material.

In the accompanying drawing,

Figure 1 represents a plan view of my improved diaphragm and Fig. 2 represents a sectional view of the same.

In these figures, 1 represents the outer portion of the diaphragm and 2 represents the more densely impregnated circular central portion, which constitutes the integral sound clarifying disk.

The resulting diaphragm is practically unaffected by changes of temperature or by the presence of moisture in the atmosphere. When used for the production or reproduction of sound it gives forth a clear and sweet tone, free from metallic resonance, which I attribute to the combined action of

the fibrous material and the hard, tough, elastic material with which it is impregnated, the qualities of each of which are united in the resulting tones.

5 While I prefer to form these diaphragms, as herein described, with a central portion of greater density, forming the sound clarifying disk as an integral part of the diaphragm itself, without increasing the thick-
10 ness of the diaphragm, I have also obtained excellent results by the use of diaphragms formed of a porous base such as blotting paper, impregnated with a solution of a phenolic condensation product and baked to
15 convert the latter into a hard, tough and elastic condition without increasing the density of the circular portion, and I claim the same as my invention.

While I prefer to employ as the impregnating material a solution of a phenolic condensation product, I may also employ any other substance as the impregnating material, which in this final state will become hard, tough and elastic and obtain the re-
25 sults desired, for example, certain gums dissolved in a suitable vehicle and applied to the absorbent material and dried with or without heat, may be employed, the central circular portion being impregnated to a
30 greater extent so as to form the integral sound clarifying disk. While I prefer to impregnate all portions of the film with the same material, I may in some instances impregnate the outer or marginal portions of
35 the diaphragm with a solution of one material, as for example, a solution of the resinous gum, and impregnate the central circular portion to a greater extent with a solution of a phenolic condensation product, and
40 these modifications are within the scope of my invention.

What I claim and desire to secure by Letters Patent is:

1. A sound reproducing diaphragm consisting of a flat sheet of material and having
45 a central, concentric, circular portion of greater density than the surrounding portions, forming a sound clarifying disk.

2. A sound reproducing diaphragm comprising a flat sheet of absorbent material impregnated with a hard, tough and elastic material throughout and having a central,
50 circular portion more densely impregnated than the surrounding portions to form an integral sound clarifying disk.
55

3. A sound reproducing diaphragm consisting of a single sheet of absorbent material impregnated with a phenolic condensation product throughout, in a hard, tough
60 and elastic condition.

4. A sound reproducing diaphragm consisting of a single sheet of absorbent mate-

rial impregnated with a phenolic condensation product throughout, in a hard, tough and elastic condition, and having a circular, 65 central portion more densely impregnated with said condensation product than the surrounding portions, forming an integral sound clarifying disk.

5. A sound reproducing diaphragm consisting of a single sheet of absorbent material having its fibers in loosely felted condition, impregnated with a phenolic condensation product in a hard, tough and elastic condition. 70 75

6. A sound reproducing diaphragm consisting of a single sheet of absorbent material having its fibers in loosely felted condition, impregnated with a phenolic condensation product in a hard, tough and elastic 80 condition, and having a central, circular portion more densely impregnated with said condensation product than the surrounding portions to form an integral sound clarifying disk. 85

7. A sound reproducing diaphragm consisting of a disk of blotting paper impregnated with a phenolic condensation product in a hard, tough and elastic condition.

8. A sound reproducing diaphragm consisting of a disk of blotting paper impregnated with a phenolic condensation product in a hard, tough and elastic condition, and having a central, circular portion impregnated more densely with said condensation 90 95 product than the surrounding portions, and forming an integral sound clarifying disk.

9. The herein-described process of producing a sound reproducing diaphragm which consists in impregnating a single sheet of absorbent material with a thin solution of a phenolic condensation product and drying the same, then further impregnating a circular, central portion of the diaphragm with said condensation product and then baking 100 105 the diaphragm to convert the said condensation product into a hard, tough and elastic condition and thereby form in the center of the diaphragm an integral sound clarifying disk. 110

10. The herein-described process of producing a sound reproducing diaphragm which consists in impregnating a single sheet of absorbent material with a solution of a resinous material, and impregnating a circular, central portion of the diaphragm to a 115 greater extent than the surrounding portions with a solution of resinous material to increase the density of said central portion beyond that of the surrounding portions and 120 form an integral sound clarifying disk.

In testimony whereof I affix my signature.

JOHN A. STEURER.

PHONOGRAPH.

1,264,268 ----- C. S. Burton,
Filed Jan. 29, 1917,
Patented Apr. 30, 1918.

C. S. BURTON.

PHONOGRAPH.

APPLICATION FILED JAN. 29, 1917.

Patented Apr. 30, 1918.

2 SHEETS—SHEET 1.

1,264,268.

Fig. 1.

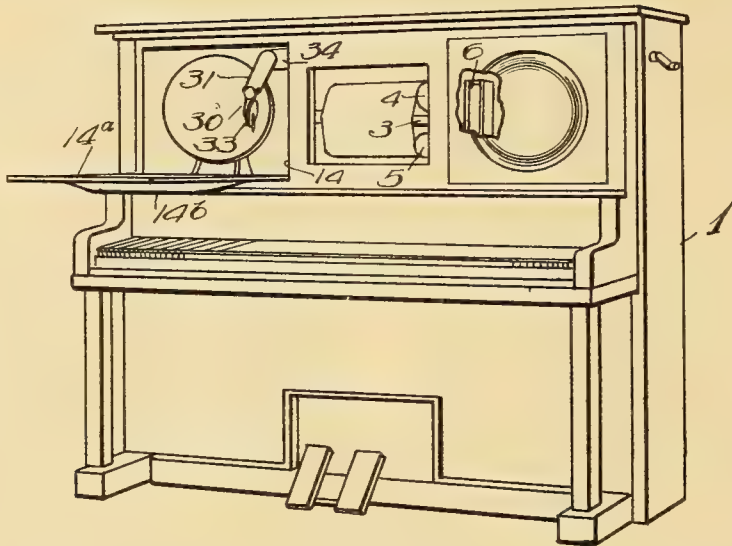
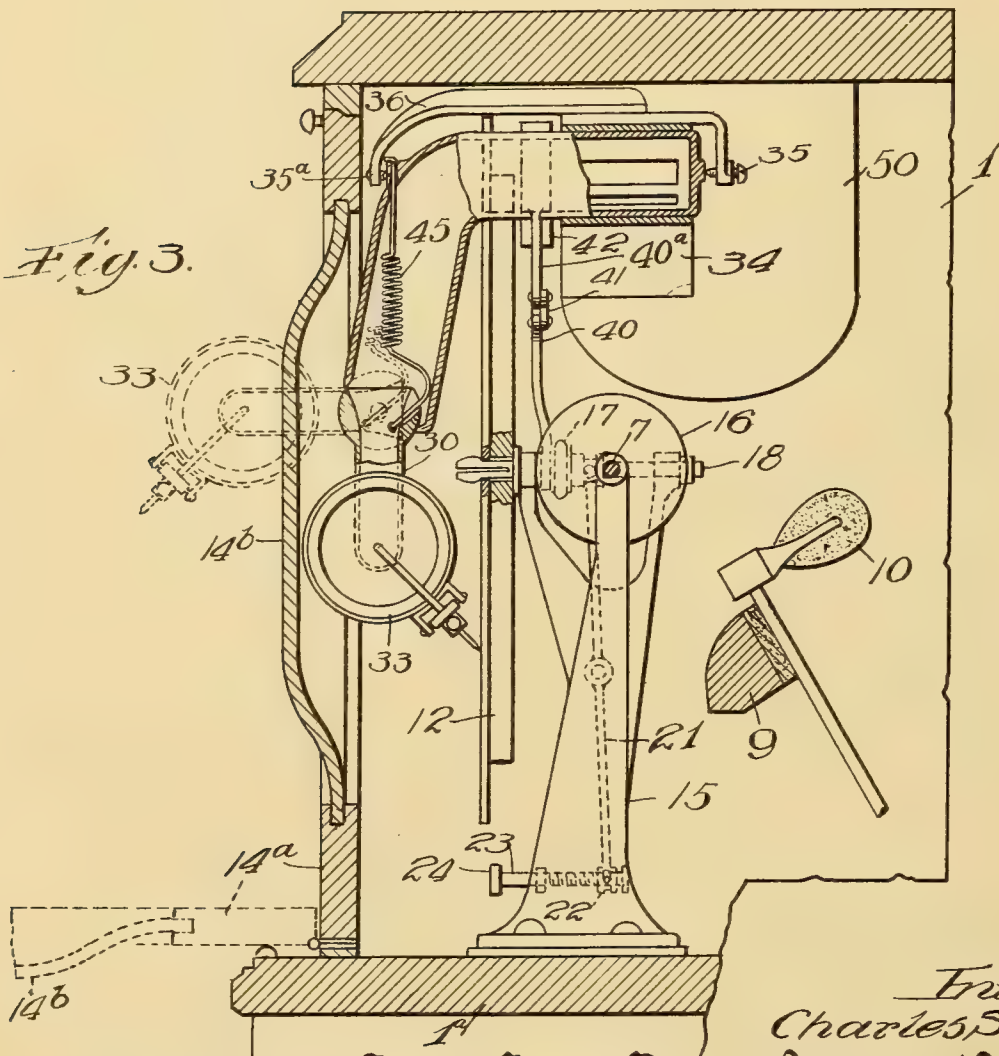


Fig. 3.



Witness:

C. S. Burton

Inventor:
Charles S. Burton,
by *Burton & Burton*
his Attys:

C. S. BURTON.

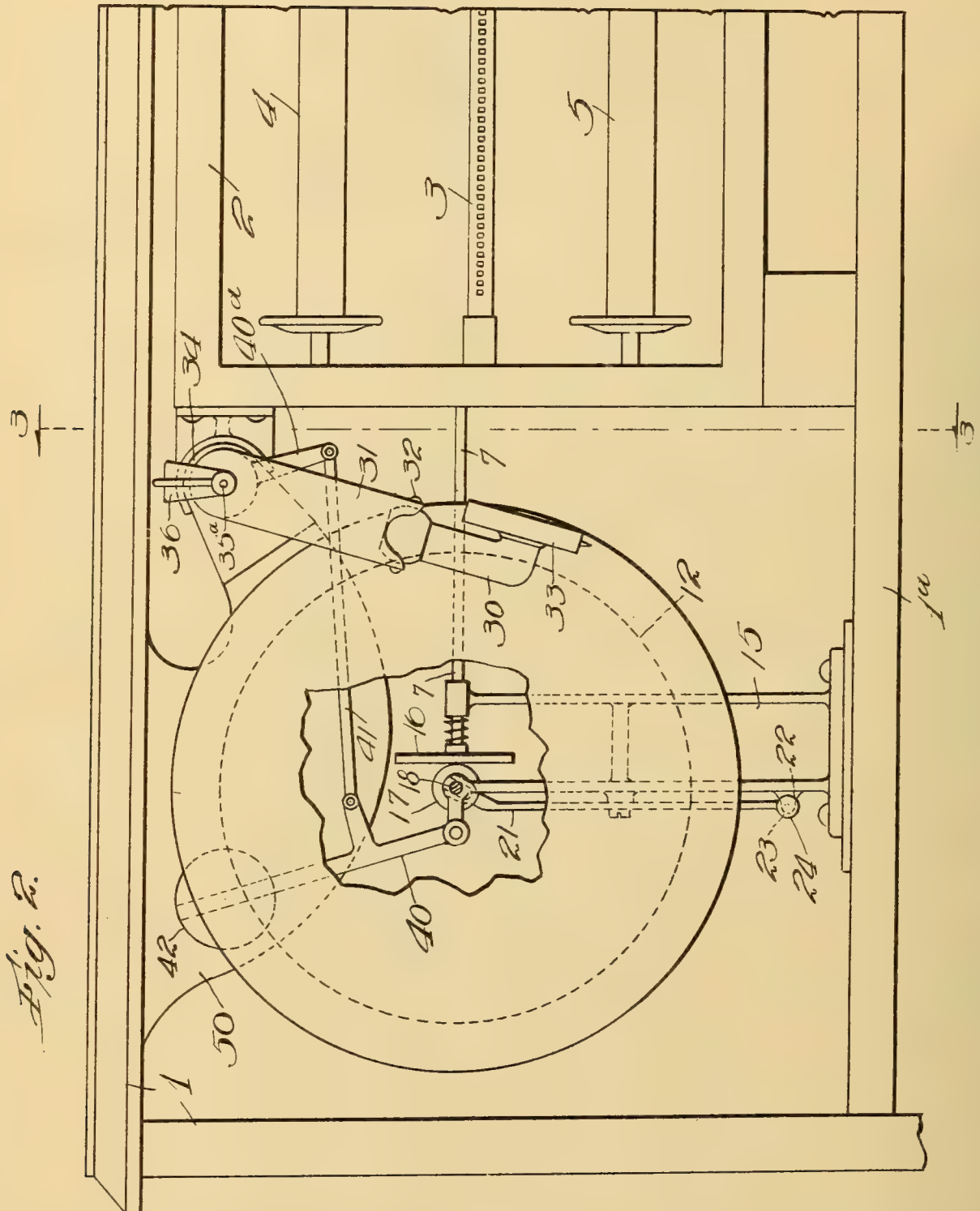
PHONOGRAPH.

APPLICATION FILED JAN. 29, 1917.

1,264,268.

Patented Apr. 30, 1918.

2 SHEETS—SHEET 2.



Witness:
C. S. Burton

Inventor:
Charles S. Burton,
by *Burton Burton*
his Atty's:

UNITED STATES PATENT OFFICE.

CHARLES S. BURTON, OF OAK PARK, ILLINOIS, ASSIGNOR TO MELVILLE CLARK PIANO COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH.

1,264,268.

Specification of Letters Patent.

Patented Apr. 30, 1918.

Application filed January 29, 1917. Serial No. 145,037.

To all whom it may concern:

Be it known that I, CHARLES S. BURTON, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented new and useful Improvements in Phonographs, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 The purpose of this invention is to provide an improved construction of a phonograph adapted to be combined with a piano and contained within the casing thereof. It consists in the elements and features of construction shown and described as indicated in the claims.

Figure 1 is a perspective view of a piano embodying this invention.

20 Fig. 2 is a front elevation of the phonograph mechanism contained in the piano case, showing certain parts of the piano case and mechanism for the purpose of indicating the relative location of the phonograph in the case.

25 Fig. 3 is a vertical section at the line 3—3 on Fig. 2.

The specific purpose of the construction shown in the drawings is to adapt a phonograph mechanism to be mounted in a piano case so as to position the record carrier and the record thereon within the space which is usually available in front of the hammer action, instead of as has heretofore been generally considered necessary, at such position that the record carrier and record stand in the wider space available within the case above the hammer action. For the purpose of so positioning the record carrier and record, the mechanism is designed and constructed to have the record carrier in a substantially erect position, presenting the face of the record to the view of the listener standing in front of the piano.

35 The general construction of the phonograph mechanism and the means for rotating the record is not herein claimed and is designed to be illustrated and described here only so far as necessary to present the particular features which are modified from the usual construction in order to accomplish the purpose of the present invention.

40 The drawings show a piano case, 1, containing an automatic player action which is indicated by the tracker box, 2, with a 55 tracker, 3, and with note sheet carrying

rolls, 4 and 5, therein. The roll operating mechanism is indicated by the outline of the frame thereof, shown at 6, at the right hand end of the tracker box. A shaft, 7, extending behind the tracker box is to be understood as connected with the train of the roll operating mechanism. This shaft communicates power for actuating the record carrier of the phonograph mechanism which is carried in the space available in the piano case at the left hand end of the tracker box of the automatic piano playing mechanism, and in front of the hammer action of the piano indicated by the hammer rest rail, 9, and hammers, 10, shown in the customary position with respect to the other parts mentioned of the automatic or player piano. The feature which distinguishes the present invention is the location of the record carrier, 12, of the phonograph in substantially erect position so as to expose the record thereon, facing forward, through the aperture, 14, formed in the front of the piano case for giving access to the phonograph. 14^a is a door for closing this opening, conveniently hinged at its lower edge for swinging forward to open, and provided with means for holding it horizontal at open position so that it constitutes a shelf upon which the records may be temporarily lodged when changing the records on the record carrier. This door is rendered ornamental by a symmetrically situated forward swell, 15^a, which serves the mechanical purpose of accommodating the sound box of the phonograph in the cavity which results at the inner side from making the swell at the outer side. For mounting the record carrier in the erect position described and supporting the carrier operating mechanism, a frame, 15, is provided mounted upon the foundation board, 1^a, (though this particular method of supporting it is not essential). The power communicating shaft, 7, extending behind the tracker box from the note-sheet-operating motor train situated at the opposite end of the tracker box obtains bearing in this frame, 15, and carries upon its left hand end a disk, 16, which rotates in frictional engagement with a friction pulley, 17, on the shaft, 18, also journaled in said frame, 15, and having the record carrier tablet, 12, mounted upon its forward upper end, said shaft, 18, being journaled in horizontal position in said frame, 15, ex-

tending therein fore-and-aft as clearly seen in Fig. 3. A means for modifying the speed of the rotation of the record carrier is shown, consisting in mounting the pulley, 17, slidably on the shaft, 18, the hub of the pulley being grooved and engaged by a forked arm, 21, having loose pivotal connections with a sleeve, 22, which is mounted upon a threaded shaft, 23, journaled in the frame, 15, and provided with a hand-wheel, 24, by which they may be rotated to cause the threaded sleeve to travel longitudinally upon it and thereby cause the forked arm similarly to slide the friction pulley, 17, along the shaft, 18, to vary the distance from the center of the friction disk, 16, at which said pulley is frictionally engaged.

The tone arm, 30, 31, is jointed at 32, the member, 30, which carries the sound box, 33, being hinged to the member, 31, said latter member being pivoted for swinging in a plane parallel to the record and carrying the sound box across the latter for playing. The said member, 31, is pivoted as described to the fixedly-supported horn bracket, 34, by center-point screws, 35 and 35^a, the former set through the back wall of the horn bracket and engaging the closed end of the discharge arm of the tone arm elbow, and the latter set through the overhanging end of a bracket, 36, secured to said horn bracket, 34. The discharge arm of the elbow is skeletonized for lateral discharge of the vibrations into the horn bracket, 34.

Upon considering the relation of the tone arm and sound box to the erect record which results from making the record carrier erect as described, it will be seen that when the tone arm is pivoted to the horn bracket in proper position to cause the sound box stylus to move across the record in a direction substantially radial thereto, as it should for proper reproduction at all points of its path, the center of gravity of the tone arm and sound box, that is, of the structure which is mounted for pivotal movement about the axis of the swivel joint of the elbow to the horn bracket, will tend to assume a position in the vertical fore-and-aft plane through said swivel axis, and therefore at every other position there will be a lateral pressure of the stylus in the groove of the record, due to gravity. Since this lateral pressure will vary at all positions in the swing of the sound box and stylus over the record, it will tend to vary the reproduction of the record at different parts, and will also tend to wear the groove on one side or the other, that is, to wear it unequally on the two sides; and it will also make the stylus liable to jump from the groove and swing to the neutral position. To prevent these results there is provided a counterbalance for the tone arm and sound box consisting in the weighted

arm, 40, pivoted at any convenient position where it can be accommodated and connected by a link, 41, with the tone arm, the pivotal connections of the link to the tone arm and to the counterbalance arm being at equal distances from the pivots about which said counterbalance arm and tone arm respectively swing, so as to give the weight, 42, an angular movement about the fulcrum of said arm, 40, equal to that of the tone arm about its fulcrum in the horn bracket, and in an arc reciprocally situated with respect to the arc through which said sound box, (or to be more exact, the center of gravity of the tone arm and its load, namely the sound box) moves in traversing the record.

In view of the erect position of the record, the sound box stylus will not be adequately held to the record by gravity; and the necessary pressure is provided by a spring, 45, stretched from a point on the tone arm member, 30, which is offset toward the plane of the record from the pivot of said member, 30, 31, said spring extending through said member, 31, to the back or top of the elbow and secured thereto. The point of attachment of the spring to the tone arm member, 30, is selected so that when the sound box is withdrawn from the record a certain distance, the line of tension of the spring passes pivot axis of the arm 30 to the arm, 31, and the spring will then react to withdraw the sound box from the record instead of holding it toward the record, and will sustain it in a convenient position for inserting and removing the stylus and introducing a record behind the tone arm on the record carrier.

To prevent the record from accidentally escaping from the center pin of the record carrier and to cause the record to be lodged against the record carrier with sufficient certainty to insure the frictional engagement between the two by which the record is carried with the record carrier, said center-pin is split and the split ends are spread apart and made elastic so that they may be closed together to admit the record onto the pin, which spreading again elastically prevents the escape of the record.

I claim:—

1. A phonograph comprising in combination with a flat rotatively mounted record carrier and means by which it is mounted with its flat record-supporting surface in an edgewise upstanding position, a sound-reproducing device and a tone arm upon which it is carried for swinging over the record upon the tablet, a pivotal support for the tone arm in such swinging movement positioned outside the circumference of the tablet at the upper side of the latter whereby said tone arm is pendant from its pivot and a weighted lever pivoted for swinging

through an arc above its fulcrum, and connections between said lever and the tone arm for causing them to swing through substantially equal arcs.

5 2. A phonograph comprising in combination with a flat rotatively mounted record carrier, and means by which it is mounted with its flat record-supporting surface in an edgewise upstanding position, a sound-reproducing device and a tone arm upon
10 which it is carried for swinging over the record upon the tablet; a pivotal support for the tone arm in such swinging movement, a lever pivoted for swinging through
15 an arc at the opposite side of the lever fulcrum from that of the sound box with respect to the tone arm fulcrum, and connections between the tone arm and said lever for causing them to swing through equal
20 arcs at said opposite sides of their respective fulcrums.

3. A phonograph comprising in combination with a flat rotatively mounted record carrier, and means by which it is mounted
25 with its flat record-supporting surface in an edgewise upstanding position, a sound-reproducing device and a tone arm upon which it is carried for swinging over the record upon the tablet; a pivotal support for
30 the tone arm in such swinging movement; a lever pivoted for swinging about its fulcrum through an arc oppositely positioned with respect to said fulcrum from the position of the sound box with respect to the
35 tone arm fulcrum, and a link connecting said lever with the tone arm for giving to the two equal angular movement about their respective fulcrums.

4. A phonograph comprising in combination with a flat rotatively mounted record
40 carrier, and means by which it is mounted with its flat record-supporting surface in an edgewise upstanding position, a sound-reproducing device and a tone arm upon
45 which it is carried for swinging over the record upon the tablet; said tone arm being

jointed between the sound box and its said pivotal support for swinging the member which carries the tone arm toward and away from the record, and a spring connected to
50 the sound-box-carrying member of the tone arm at a point offset toward the plane of the record from the hinge pivot of said member to the other member of the tone
55 arm, and reacting from its point of attachment to said member back along the length of the other member of the tone arm, the hinge connection between the two members of the tone arm being adapted to permit the
60 sound-box-carrying member to be swung about said hinge to carry the sound-box away from the record through an angle sufficient to carry the line of tension of said spring past the hinge pivot.

5. A phonograph comprising in combination with a flat rotatively mounted record
65 carrier, and means by which it is mounted with its flat record-supporting surface in an edgewise upstanding position, a sound-reproducing device and a tone arm upon which it is
70 carried for swinging over the record upon a tablet in a substantially vertical plane, the tone arm being jointed between the sound box and its said pivotal support for folding at its said joint to carry the sound
75 box toward and from the record, and a spring connected at a point on the sound-box-carrying member of the tone arm offset from the hinge pivot toward the record and stretched longitudinally of the other mem-
80 ber of the tone arm within the latter toward the pivot; whereby the swinging of the sound-box-carrying member to carry the sound-box away from the record carries the point of attachment of said spring to
85 said swinging member past the hinge axis, the spring being strong enough to hold the sound box away from the record.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 26th
90 day of January, 1917.

CHARLES S. BURTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINES.

1,264,273 ----- F. Cirelli,
Filed Sept. 8, 1917,
Patented Apr. 30, 1918.

F. CIRELLI.
TALKING MACHINE.
APPLICATION FILED SEPT. 8, 1917.

1,264,273.

Patented Apr. 30, 1918.
2 SHEETS—SHEET 1.

Fig. 1.

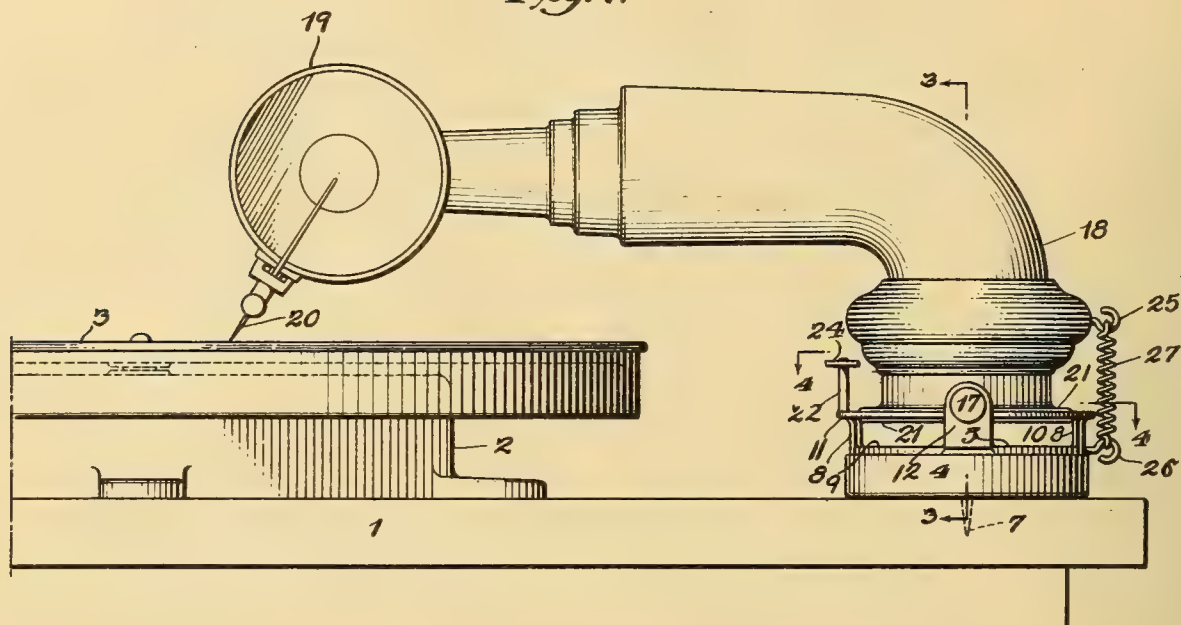
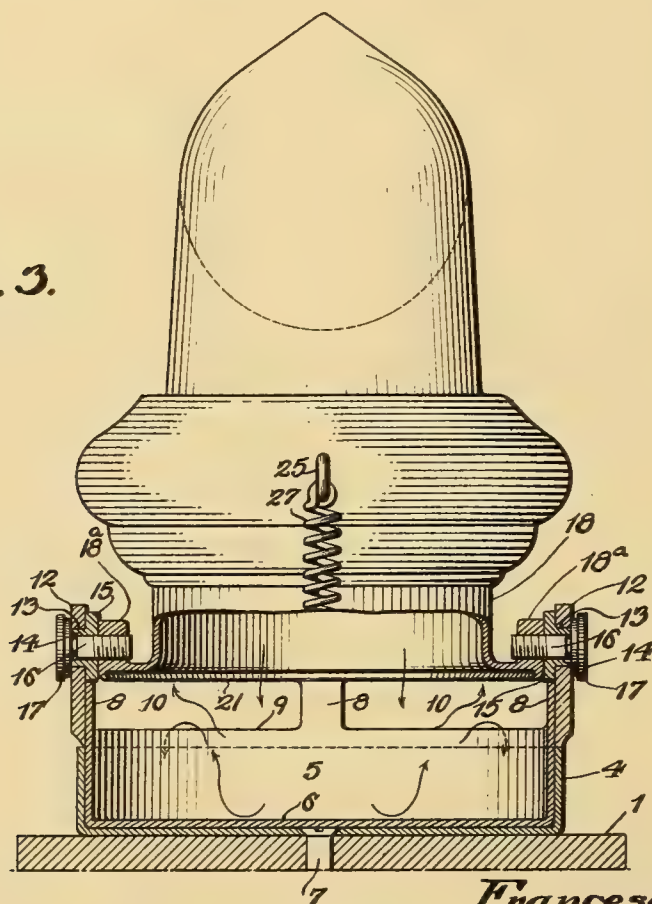


Fig. 3.



Witnesses

H. Harwood.
C. R. Ziegler.

Inventor

Francesco Cirelli.
By *Joshua H. H. H.*
his Attorney

1,264,273.

Patented Apr. 30, 1918.
2 SHEETS—SHEET 2.

Fig. 2.

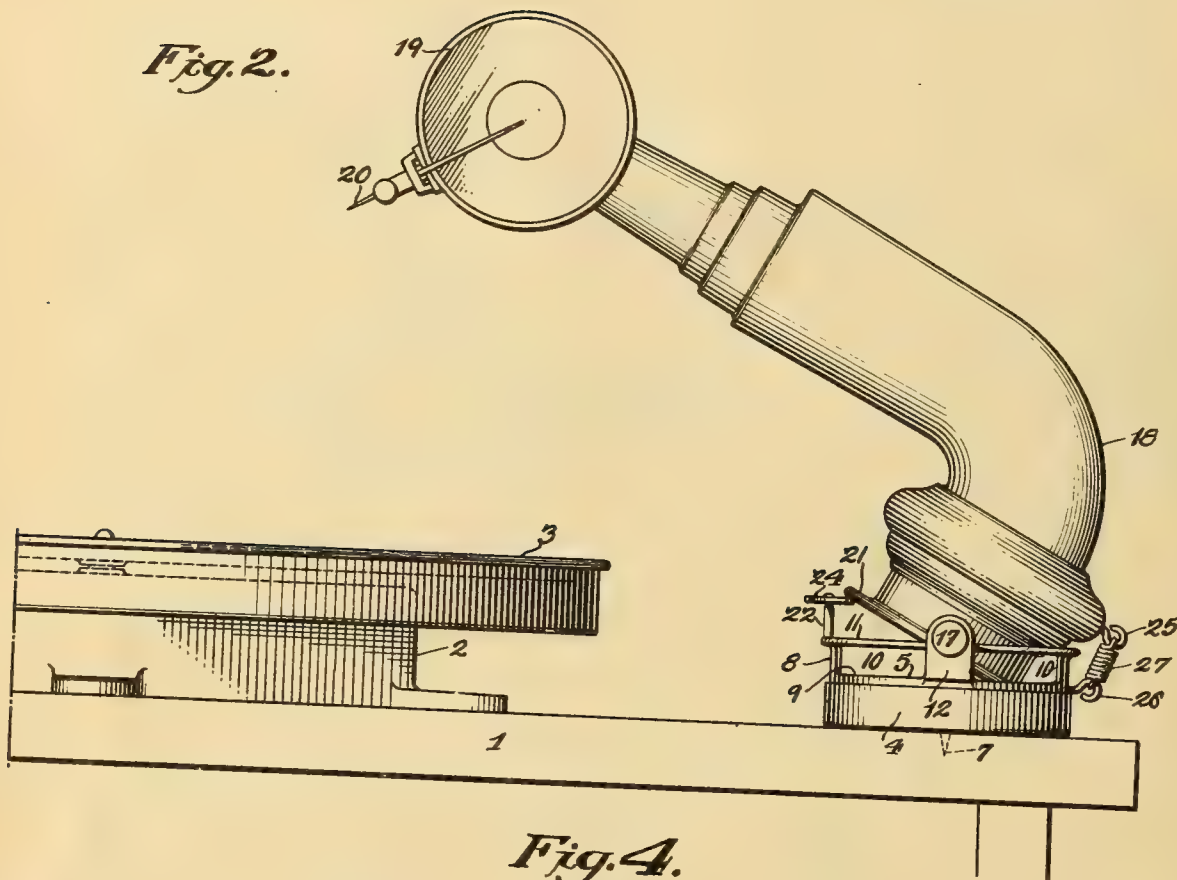


Fig. 4.

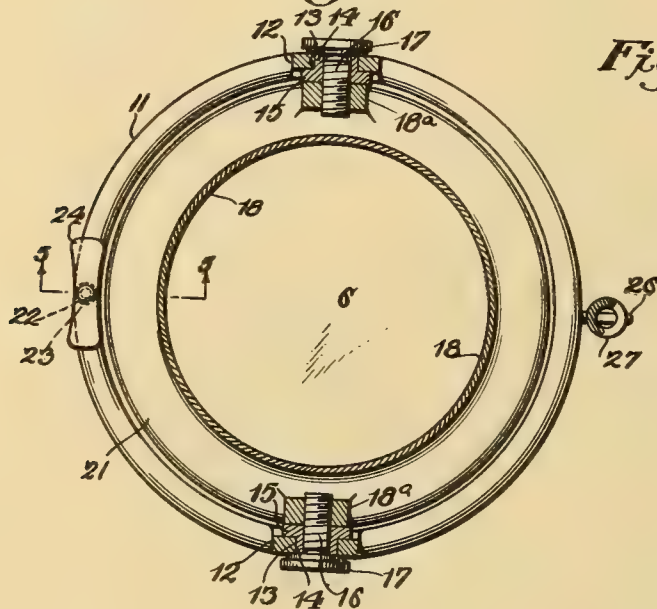
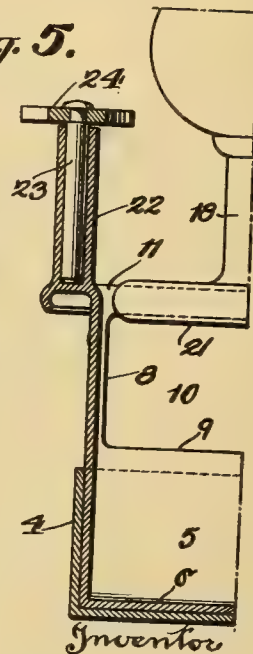


Fig. 5.



Witnesses
H. Harwood.
C. R. Ziegler.

Francesco Cirelli.
By Joshua R. H. Votke.
His Attorney

UNITED STATES PATENT OFFICE.

FRANCESCO CIRELLI, OF PHILADELPHIA, PENNSYLVANIA.

TALKING-MACHINE.

1,264,273.

Specification of Letters Patent.

Patented Apr. 30, 1918.

Application filed September 8, 1917. Serial No. 190,287.

To all whom it may concern:

Be it known that I, FRANCESCO CIRELLI, a subject of the King of Italy, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

One object of my invention is to provide improved sound transmitting apparatus for talking machines which renders it unnecessary to employ a horn or cabinet construction such as has been the custom to employ prior to my invention.

Another object is to so construct my improved sound transmitting apparatus that it can be used in various positions and places such for example as on an ordinary table or board and can be moved bodily independently of the record support.

A further object is to so construct my invention that it will be of simple construction, durable and can be manufactured and sold at a reasonably low cost.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is a side elevation of my invention shown in operative engagement with but mounted independently of a motor driven record.

Fig. 2 is a view of similar nature to Fig. 1 but showing my invention out of engagement with the record.

Fig. 3 is an enlarged section on the line 3—3 of Fig. 1 showing the upper portion of the horn in outside view.

Fig. 4 is an enlarged sectional plan taken on the line 4—4 of Fig. 1.

Fig. 5 is an enlarged fragmentary section taken on the line 5—5 of Fig. 4 showing a portion of the tone arm in outside view.

Referring to the drawings, 1 represents a table or support which may be of any construction upon which is placed a motor 2 for rotating a disk record 3. A cylindrical tray 4 of metal, hard rubber, or other suitable material, is adapted to rest upon a supporting structure such for example as the table 1.

A cylindrical cup 5, preferably of metal, rotatably fits within the tray 4 and has a closed bottom 6. The tray 4 can be secured to the table or other support 1 by a screw 7 or if it is desired, this tray may be free to

be moved on the table at the will of the operator by omitting the screw.

The cup 5 has standards 8 which project upwardly at different points throughout its circumference and thereby provides openings 10 as clearly illustrated. A ring or band 11 is supported on the tops of the standards 8, and this ring serves to strengthen the standards by connecting them together.

Two of the standards 8 which are diametrically opposite each other have extensions 12. These extensions have holes 13 in which are placed rubber or other non-metallic bushings 14 which have internal flanges 15. Adjusting screws 16 pass through the bushings 14 and have heads 17 whereby they may be manually actuated. These screws 16 form a swinging support for up-turned flanges 18^a on the bottom of a tone arm 18, the opposite end of which supports the sound box 19 having a needle 20 for engagement with the record 3.

The bottom edge 21 of the tone arm 18 is positioned at a higher level than the edge 9 of the cup 5, so that the openings 10 will form outlets for the sound reproduced from the record through the medium of the needle 20, sound box 19 and tone arm 18, after the sound has been transmitted into the cup 5, it being noted that the closed bottom 6 of the cup 5 serves as a stop for the sound as it passes out of the tone arm in the directions of the arrows as illustrated and causes the sound be deflected upwardly and out of said openings 10 where it is distinctly audible.

The journal screws 16 permit the tone arm to rock in a vertical plane as illustrated, and the cup 5 is freely rotatable within the tray 4 so that the tone arm 18 is free to move in any direction required during the reproduction of the record.

A journal sleeve 22 projects upwardly from the ring 11 and forms a bearing for a rotatable post 23 which has a turn-stile 24 at its upper end. This turn-stile when in its normal position as shown in Figs. 1 and 4, permits the tone arm to freely swing on the journal screws 16. However, if it is desired to remove the needle 20 from the record, the tone arm can be swung into the position shown in Fig. 2, and the turn-stile turned so that it engages under the edge 21 and thereby holds the tone arm in a raised position to permit the ready changing of the needle or for any other purpose desired.

Eyelets 25 and 26 are respectively formed on the tone arm 18 and cup 5, and a coiled spring 27 connects these eyelets. This spring serves as a resilient counterbalance for the arm to relieve some of the pressure which would otherwise occur on the record when the needle is in engagement therewith and also serves to permit the tone arm to be easily swung into its raised position.

The cup 5 serves as a receptacle for the sound after it has passed out of the tone arm, and the bottom 6 and side of the cup causes the sound to rebound out of the openings 10.

The reproduced tone of a record through the aid of my invention as above described is extremely rich and quite distinct, giving practically a true representation of the record being played.

My invention is extremely desirable as a portable device which can be readily carried and which can be quickly and easily placed in active position relative to any rotatable record and support.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device of the character described, the combination of a cylindrical cup, a tone arm having its delivery end connected to said cup and adapted to transmit sound into said cup, and means forming a cylindrical socket in which said cup fits and is free to rotate, said cup having an opening above its bottom to provide an outlet for said sound, substantially as described.

2. In a device of the character described, the combination of a comparatively shallow cylindrical cup open at its top, a tone arm movably connected to said cup and having its delivery end in alinement with the open top of said cup, and means providing a cylindrical socket in which said cup fits and is free to rotate, said cup having a lateral opening above its bottom to provide an outlet for said sound, substantially as described.

3. In a device of the character described, a supporting structure, a tone arm pivoted to the supporting structure, and a turnstile mounted on the supporting structure and adapted to be swung under a portion of said tone arm to hold the latter in an inclined position, substantially as described.

4. In a device of the character described, the combination of a shallow cup, a tone arm having its delivery end connected to said cup and adapted to transmit sound into said cup, and means forming a socket in which said cup fits and is free to rotate, said cup having an opening above its bottom to provide an outlet for said sound, substantially as described.

5. The combination of a tone arm, a cylindrical cup, standards projecting upwardly from the cup, means forming a pivotal connection between the standards and the tone arm, said tone arm having its delivery end positioned above the top of the cup to permit the escape of the sound after it has been delivered into the cup through the medium of the tone arm, substantially as described.

6. The combination of a tone arm, a cylindrical cup, standards projecting upwardly from the cup, means forming a pivotal connection between the standards and the tone arm, said tone arm having its delivery end positioned above the top of the cup to permit the escape of the sound after it has been delivered into the cup through the medium of the tone arm, and a tray into which said cup rotatably fits, substantially as described.

7. The combination of a cup having an open top, a tone arm movably connected to the cup and having its delivery end in alinement with said opening and adapted to transmit sound into said cup, and a tray having a flat bottom and forming a socket in which said cup fits and is free to rotate, said cup having a lateral opening above its bottom to provide an outlet for said sound, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCESCO CIRELLI.

Witnesses:

MARY A. INGLAR,
CHAS E. POTTS.

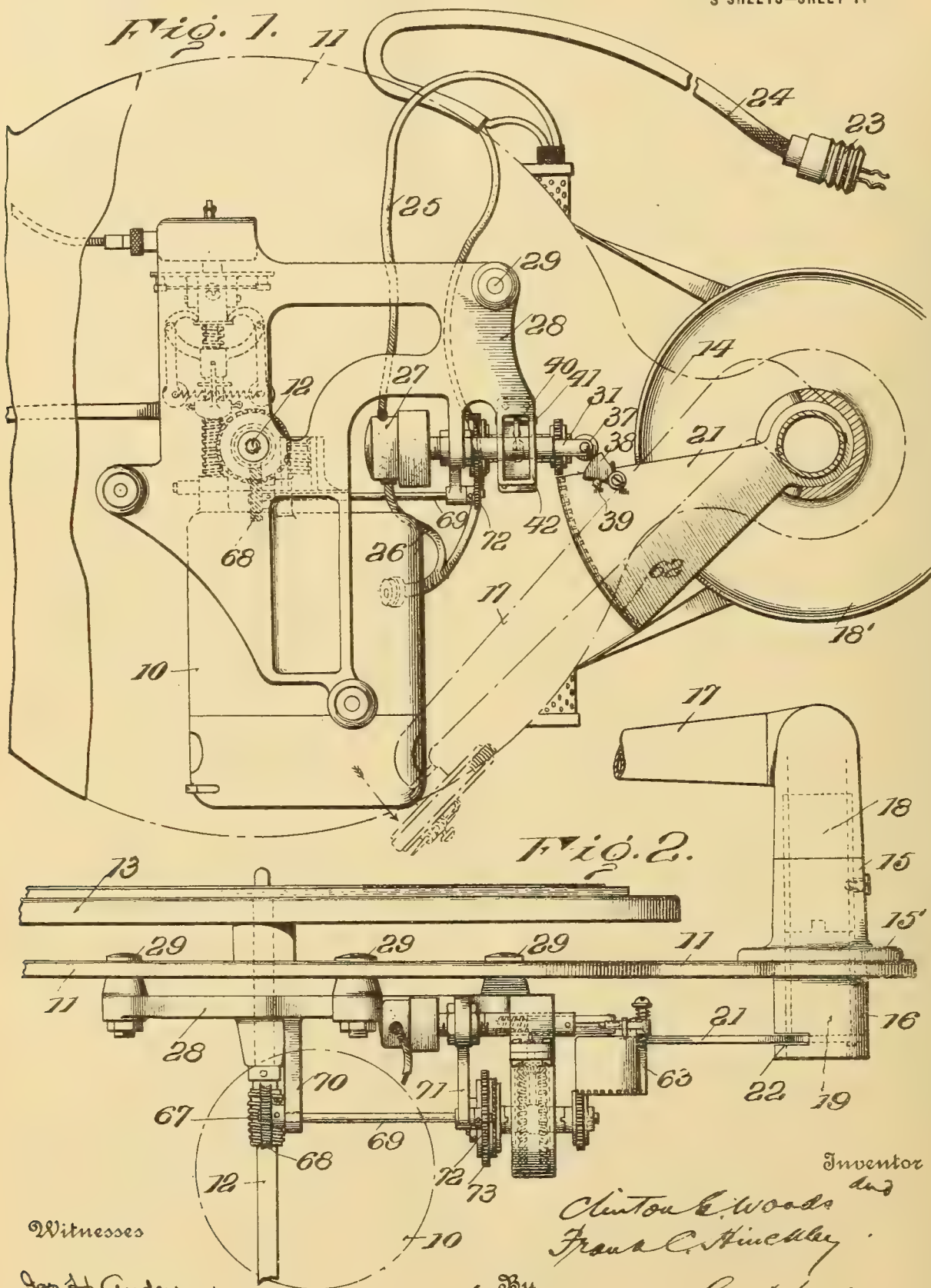
START AND STOP MECHANISM FOR TALKING MACHINES.

1,264,588 ----- C. E. Woods & F. C. Hinckley,
Filed Oct. 15, 1913, Renewed
Mar. 10, 1916,
Patented Apr. 30, 1918.

C. E. WOODS & F. C. HINCKLEY.
 START AND STOP MECHANISM FOR TALKING MACHINES.
 APPLICATION FILED OCT. 15, 1913. RENEWED MAR. 10, 1916.

1,264,588.

Patented Apr. 30, 1918.
 3 SHEETS—SHEET 1.



Witnesses
 Jno. H. Anderson.
 R. C. Fitzhugh.

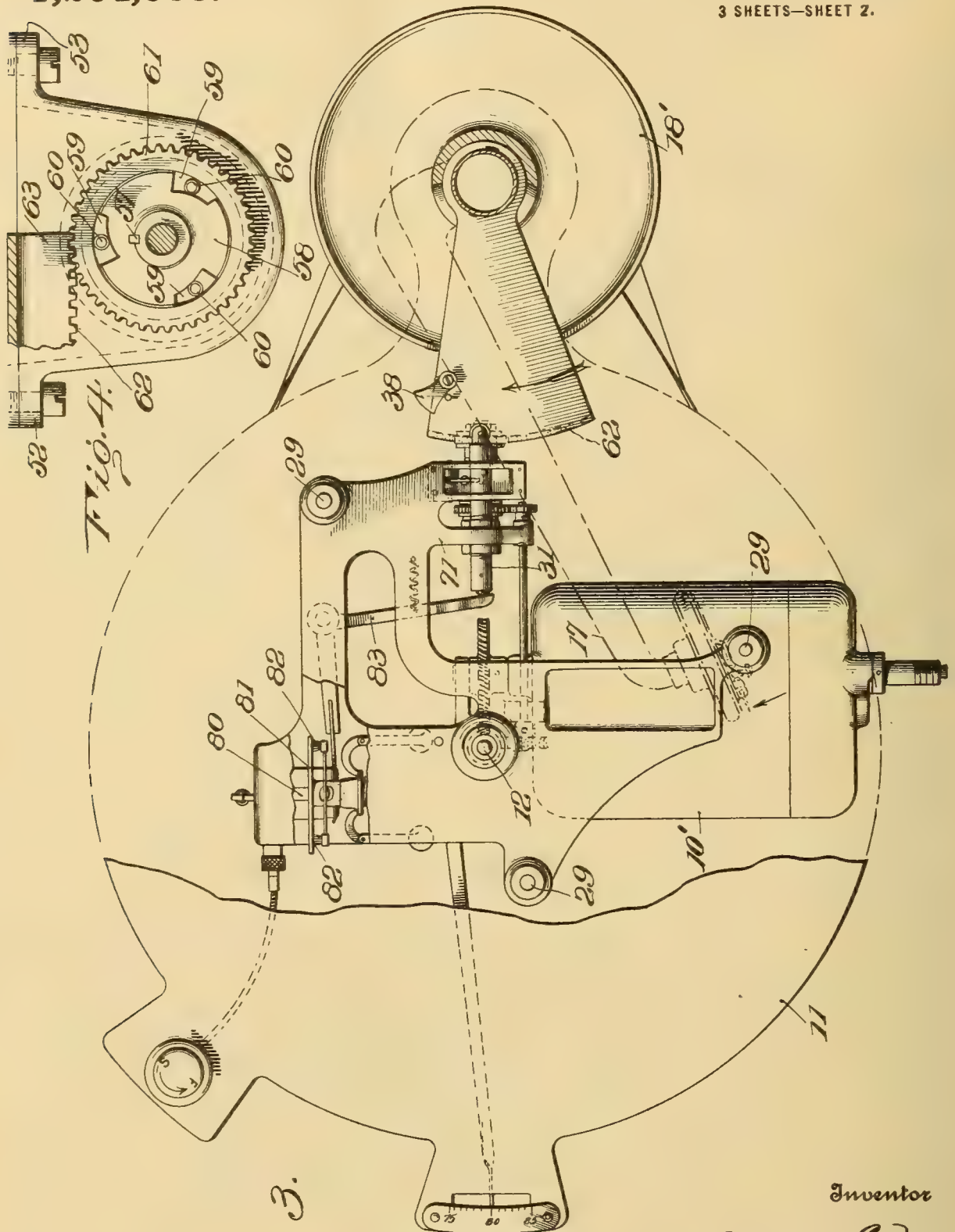
Inventor
 Clinton E. Woods and
 Frank C. Hinckley.
 By
 Law. Amos. Lewis & Co.
 Attorneys

C. E. WOODS & F. C. HINCKLEY.
 START AND STOP MECHANISM FOR TALKING MACHINES.
 APPLICATION FILED OCT. 15, 1913. RENEWED MAR. 10, 1916.

1,264,588.

Patented Apr. 30, 1918.

3 SHEETS—SHEET 2.



Witnesses
 Geo. H. Anderson.
 R. C. Fitzhugh

Fig. 3.

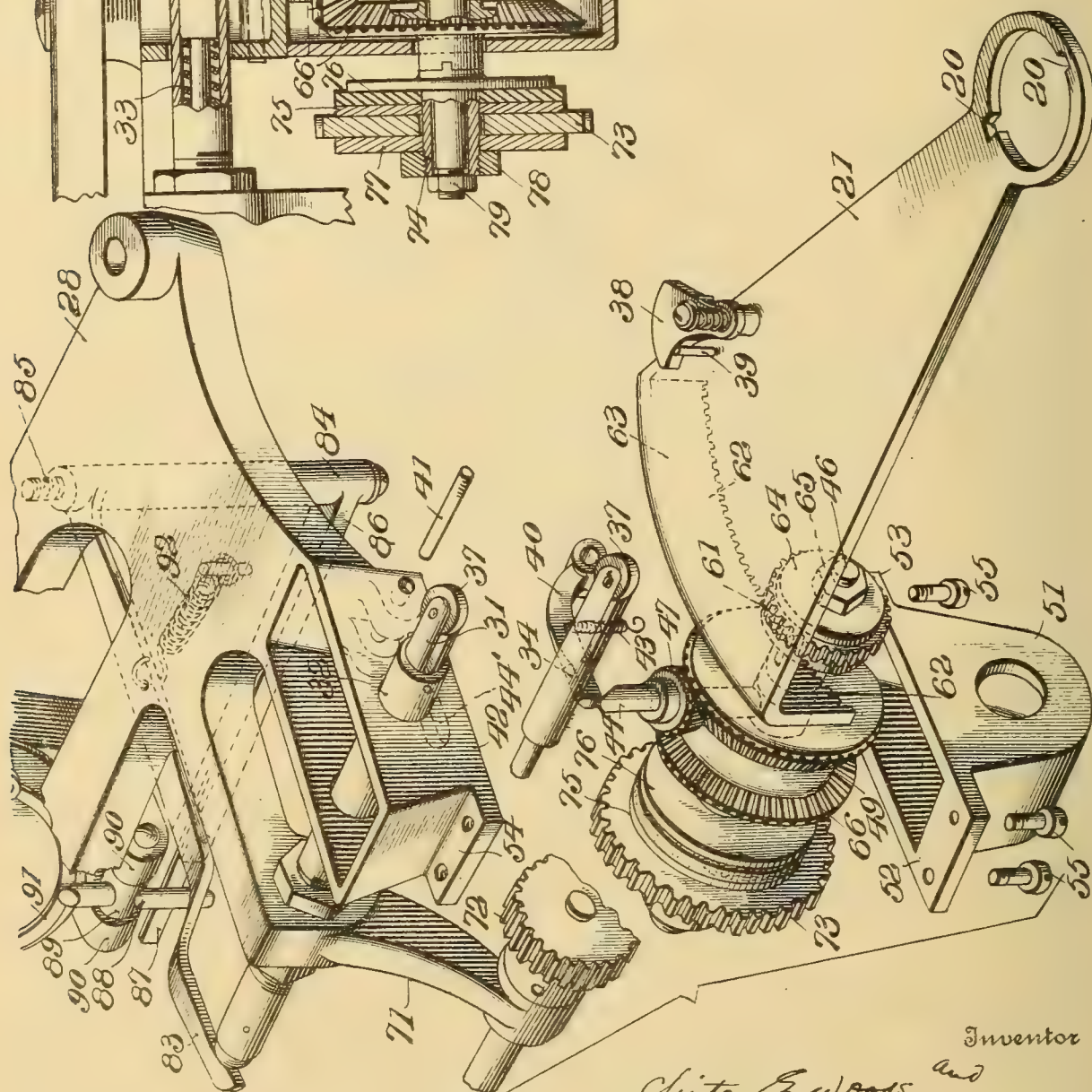
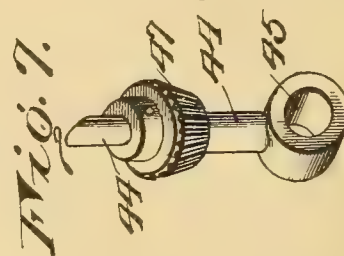
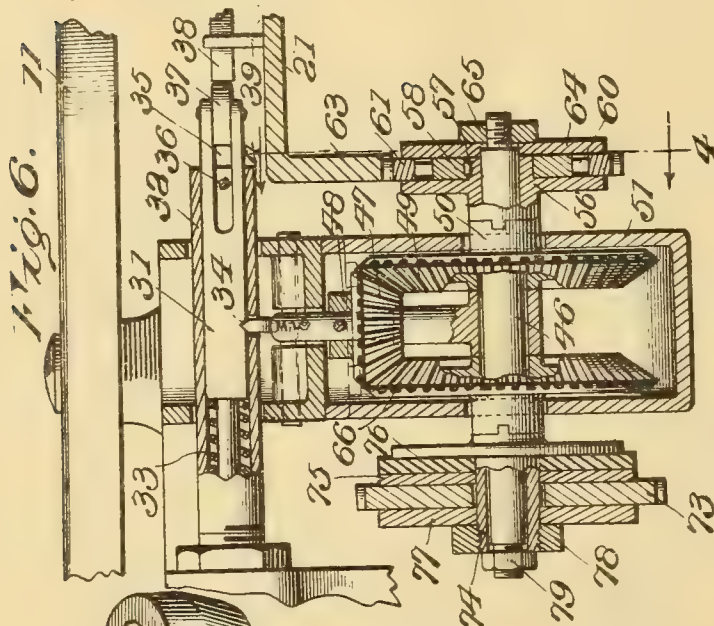
Inventor
 Clinton E. Woods and
 Frank A. Hinckley
 By
 Maxw. Cameron, Lewis & Macmillan
 Attorneys

C. E. WOODS & F. C. HINCKLEY.
 START AND STOP MECHANISM FOR TALKING MACHINES.
 APPLICATION FILED OCT. 15, 1913. RENEWED MAR. 10, 1916.

1,264,588.

Patented Apr. 30, 1918.

3 SHEETS—SHEET 3.



Witnesses
 Jas. H. Anderson,
 R. C. Fitzhugh.

Fig. 5.

Inventor
 Clinton E. Woods and
 Frank C. Hinckley.

By
 Mauro, Cameron, Lewis & Hossie
 Attorneys

UNITED STATES PATENT OFFICE.

CLINTON E. WOODS AND FRANK C. HINCKLEY, OF BRIDGEPORT, CONNECTICUT, ASSIGN-
ORS TO AMERICAN GRAPHOPHONE COMPANY, OF BRIDGEPORT, CONNECTICUT, A
CORPORATION OF WEST VIRGINIA.

START AND STOP MECHANISM FOR TALKING-MACHINES.

1,264,588.

Specification of Letters Patent.

Patented Apr. 30, 1918.

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To all whom it may concern:

Be it known that we, CLINTON E. WOODS and FRANK C. HINCKLEY, of Bridgeport, Connecticut, have invented a new and use-
ful Improvement in Start and Stop Mechanism for Talking-Machines, which invention is fully set forth in the following specification.

This invention relates to mechanism adapted to automatically stop and preferably also automatically start talking machines, and is designed more particularly for use in connection with that class of talking machines in which a tone-arm or other tubular sound-conductor, together with the reproducer, is advanced across the face of a disk record in the act of reproducing said record. With said devices the machine is automatically started when the operator places the reproducer and tone-arm in position to commence reproduction and automatically stopped when, for any reason, the reproducer and tone-arm cease their advance movement across the face of the record.

One of the objects of the present invention is to provide a start-and-stop mechanism which will be highly efficient in operation and will operate equally well however the different records reproduced may vary in the number of threads to the inch.

An objection to the start-and-stop mechanisms at present employed is that, after the tone-arm comes to rest, the sound record is not promptly stopped but continues to rotate, sometimes fifteen or twenty times, before the machine is stopped, thus prolonging the disagreeable scraping sound of the stylus on the record; and by the present invention it is sought to obviate this objectionable feature by promptly stopping the motor after the tone-arm has ceased to move.

With machines employing start-and-stop mechanism connected to and controlled by the tone-arm, it has heretofore been necessary to exercise care in manually moving the tone-arm to prevent injury to the parts; and it is a further object of the present invention to provide a device which will obviate this objection and which is so simple and durable in construction as to practically eliminate the chance of injury by careless handling.

Briefly stated, the invention consists, generally, in providing a record support across

which the tone-arm is propelled, and in introducing between the tone-arm and motor two movable members, one connected to the tone-arm and the other to the motor, said members normally moving at substantially the same speed. These members engage and operate a third member which is normally held in position to permit the motor to run, but which third member is moved to effect the stopping of the machine when one of said first two members ceases to move, or its speed of movement is materially varied, as by decreasing below a predetermined limit. In the preferred embodiment of the inventive idea illustrated herein, a differential gearing is introduced between the motor and the tone-arm, this gearing, as herein shown, preferably consisting of two bevel gears, one driven from the tone-arm and the other from the motor. Normally they rotate at substantially the same speed in opposite directions, and mesh with and rotate a bevel pinion, the movement of which latter operates, through suitable connections, to stop the machine when one of said bevel gears ceases to rotate.

The invention will be better understood by reference to the accompanying drawings, illustrating one expression of the inventive idea, and wherein—

Figure 1 is a top plan view showing the start-and-stop mechanism constituting the present invention, operating in association with an electric motor;

Fig. 2 is a vertical elevation of the mechanism shown in Fig. 1;

Fig. 3 is a view similar to Fig. 1, showing the start-and-stop mechanism operating in association with a spring motor;

Fig. 4 is a detail elevation, partly in section, showing the slip connection between the pinion that meshes with the rack on the lever arm (connected to the tone-arm) and its associated bevel gear;

Fig. 5 is a detached perspective view, showing the start and stop mechanism;

Fig. 6 is a vertical section through said mechanism; and

Fig. 7 is a perspective view.

Referring to the drawings, wherein like reference numerals indicate like parts, 10 is a suitable motor, whether spring or electric, secured in any usual or desired manner to the under side of a motor-board 11. Said

motor drives a vertical shaft 12 which passes through the motor-board on which is mounted the usual turn-table or record support 13 (Fig. 2). The motor-board is provided
 5 with a perforated ear 14, preferably formed integrally therewith, on which ear is mounted a hollow support 15 for the tone-arm. This support is provided with a flange 15' which rests on the ear, and an extension 16
 10 that passes through the perforation in the ear in snug engagement therewith.

The tone-arm is preferably composed of a horizontal section 17 (to which the usual or any suitable sound-box is secured), and
 15 a vertical section 18 which, as here shown, is associated with the sound deflector 18', though any suitable amplifying horn may be employed. Within the vertical section 18 is preferably secured, to turn therewith, an
 20 annular member 19 provided at its upper end with a plurality of lugs which engage in corresponding recesses in section 18, and at its lower end with lugs which engage corresponding recesses 20 (Fig. 5) in a con-
 25 necting arm 21 which is rotatable in a recess 22 in said extension 16. By this, or any other suitable connection between the tone-arm and said connecting arm 21, the movements of the tone-arm are transmitted
 30 to the connecting arm so that as the tone-arm is propelled across the record, the connecting arm 21 will be moved through the same angular distance. The starting and stopping of the machine are controlled by
 35 the movements of the tone-arm operating through said connecting arm 21, the latter acting to effectively perform its function, whether it is associated with an electric motor 10, as indicated in Fig. 1, or with a
 40 spring motor 10', as indicated in Fig. 3.

Referring particularly to Fig. 1, 23 is the usual electric plug connected to conductor 24 which conveys current to the electric motor 10, and 25 and 26 are conductors that
 45 lead to a suitable switch mechanism (not shown) contained in casing 27 carried by the casting 28 which is secured to the motor-board in any suitable manner, as by a plurality of bolts 29 (Fig. 2). The circuit
 50 to the motor is opened and closed at said switch by a movable element or terminal 31 which is carried in a sleeve 32 (Fig. 6) connected to the switch casing, said terminal being under the tension of a spring 33, the
 55 tendency of which is to force said terminal toward the right. This terminal is provided, preferably in its underside, with an inverted V-shaped notch 34 for a purpose which will hereinafter be described, and is
 60 slotted, at 35, to accommodate a pin 36 mounted in sleeve 32, which pin prevents the terminal 31 from rotating. The free end of said terminal is preferably provided with an anti-friction roller 37 which is adapted to
 65 be engaged by a spring-pressed pivoted dog

38 carried by the connecting arm 21, said dog being normally held in engagement with a stop or abutment 39 also carried by said arm 21. When said dog 38 engages
 roller 37, as the tone-arm is being moved
 70 toward the center of the record, the plunger 31 is moved to the left to the position shown in Fig. 6, and said terminal 31 is held in that position by the engagement in notch 34 of a latch 40 carried by a pin 41 (Fig. 5)
 75 having bearings in housing 42 which is preferably integral with the casting 28. It is through openings in the side walls of this housing that projects sleeve 32 carrying the terminal or plunger 31. The latch 40 has
 80 one end of a spring 43 connected thereto, the other end of said spring being anchored in said housing 42, said spring acting to withdraw the latch 40 from the inverted V-shaped notch 34.
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When the parts are in the position shown in Figs. 5 and 6, it will be observed that latch 40 is held in engagement with notch 34 (to maintain the plunger or terminal 31 in position to permit the machine to op-
 90 erate) by the engagement with the nose of said latch of the beveled end of a pin 44, the other end of said pin being provided with an eye 45 which loosely encircles a rod 46. The upper beveled end of this pin projects
 95 through a slot 44' (Fig. 5) in the bottom of housing 42, for the purpose of limiting the movement of said pin around rod 46, the inner or right hand end of said slot (Fig. 5) acting as a stop for the pin 44 so
 100 that said pin, while holding latch 40 firmly in engagement with the V-shaped notch 34, cannot move so far as to jam against said latch or to offer any considerable resistance to its movement from under the latch at
 105 the proper time. This pin carries a bevel pinion 47 which is loosely mounted thereon, said pinion being held in place by collar 48 keyed to said pin. The bevel pinion meshes with a bevel gear 49 which is also loosely
 110 mounted on rod 46, said pinion 49 being provided with a hub 50 (Fig. 6) which projects through an opening in the side wall 51 of a casing which is provided with flanges 52 and 53. When the parts are in assembled
 115 position, flange 52 (Fig. 5) is secured to flange 54 on boxing 42 by any suitable means, as screws 55, flange 53 being also secured to the bottom of said boxing.

The hub 50 is keyed to the hub of an an-
 120 nular member 56 also loosely mounted on rod 46, to which member is fixedly secured, as by a key 57, a plate 58 (Figs. 4 and 6) provided with a plurality of tapering slots 59 (here shown as three), each of which
 125 slots carries a roller 60, which rollers engage a pinion 61 which meshes with a rack 62 provided on a downwardly extending member 63, preferably integrally connected to connecting arm 21. A plate 64 engages
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the face of pinion 61 and plate 58, and a nut 65 is screwed onto the end of rod 46 and holds the parts in the position shown in Fig. 6. Through these connections, bevel gear 49 is rotated in a clockwise direction when the tone-arm is being propelled across the sound record, during reproduction. When the tone-arm is being manually returned to starting position, the bevel gear 49 is not rotated, for the reason that the pinion 61, as it rotates in a counter-clockwise direction, moves the rollers 60 from the smaller ends of slots 59 into the larger ends thereof, where said rollers idly rotate, none of the movement of pinion 61 being at this time transmitted to its associated parts. When, however, the pinion 61 is rotated in a clockwise direction by engagement therewith of rack 62, said pinion will walk the rollers 60 in the same direction and force them into the tapered ends of slots 59, whereupon the plate 58 and bevel gear 49 will be rotated in a clockwise direction.

The bevel pinion 47 meshes with a second bevel gear 66 which is identical with bevel gear 49, said gear 66 being driven from the motor, through suitable connections, at substantially the same speed of rotation as said gear 49, but in a direction opposite to that of gear 49. Referring particularly to Figs. 2 and 6, 67 indicates a worm mounted on vertical shaft 12, which worm meshes with a worm-gear 68 mounted on one end of a shaft 69 which has bearings in lugs 70, 71, preferably integrally formed with casting 28. The other end of said shaft 69 carries a pinion 72 which meshes with a gear 73 loosely mounted on a collar 74 which turns freely on rod 46, said collar being keyed to the hub of bevel gear 66. For a purpose to be hereinafter described, a friction-drive is provided between gear 73 and bevel gear 66, and as here shown, a steel disk 75 and a rubber disk 76 secured thereto are fixedly mounted on said sleeve 74, the steel disk 75 engaging one face of gear 73. The other face of gear 73 is preferably engaged by a steel plate 77 fixed to sleeve 74, the parts being held in position by nuts 78 and 79.

When the parts are in the position shown in Figs. 5 and 6, the bevel gears 49 and 66 are rotating at substantially the same speed in opposite directions, and inasmuch as they both mesh with bevel pinion 47, the latter is rotated on its axis, and reproduction is being effected. Any difference in the speed of rotation of gears 49 and 66 will be in favor of the former, in order to hold pin 44 securely against the end of slot 44' and in engagement with latch 40. When the tone-arm ceases its movement, as, for example, when it reaches the end of the record, bevel gear 49, which is driven therefrom, will also cease rotating, whereas bevel gear 66 being driven from the motor will

continue to rotate. The continued rotation of bevel gear 66 will not only cause pinion 47 to rotate around its axis, but will also cause member 44 to rotate around rod 46, thus removing the beveled end of said member from engagement with the nose of latch 40, whereupon spring 43 will withdraw latch 40 from inverted V-shaped notch 34 in plunger or terminal 31. Spring 33 will promptly force plunger 31 toward the right and into the position indicated in Fig. 2, whereupon (if an electric motor is employed) the circuit to the motor will be opened and the machine stopped or, if a spring motor is employed, the plunger 31 will act through suitable connections to apply the usual friction pads to stop the machine.

In Figs. 3 and 5, the present invention is shown as applied to a talking machine which is operated by such a spring motor. Referring to Fig. 3, 80 indicates the governor shaft, and 81 a friction disk keyed to said shaft. In this embodiment of the inventive idea, the movement toward the left of plunger or terminal 31 operates, by any suitable means, to remove friction pads 82 from the friction disk to permit the machine to start, whereas the movement of said terminal or plunger toward the right in Fig. 3 operates to press the friction pads 82 against friction disk 81 to stop the machine. The particular means here shown consists of a lever 83, one end of which engages the movable element or terminal 31, and the other end of which is securely fixed to the upper extremity of a sleeve 84 (Fig. 5) rotatable on a pin 85 secured in casting 28, the lower extremity of said sleeve carrying an arm 86, to the free end of which is secured a resilient member 87. This member bears against a downwardly projecting arm 88 carried by a rod 89 suitably mounted in brackets 90, said rod carrying a friction pad-supporting member 91, to which is secured a plurality of friction pads 82 which, as heretofore stated, are pressed against friction disk 81 to stop the motor. As will be seen, the pads 82 are moved into engagement with disk 81 by the tension of spring 92.

The operation of the device is as follows:—

During reproduction the tone-arm 17 is fed across the sound-record by the engagement of the stylus with the record-groove, and accordingly bevel gear 49 is rotated in a clock-wise direction by reason of the engagement between the rack 62 carried by connecting arm 21 and pinion 61. At the same time, bevel gear 66 is being driven from the motor in a counter-clock-wise direction, but substantially at the same speed as that of gear 49, the action of said bevel gears 49 and 66 being to rotate bevel pinion 47

on its axis, and to maintain the parts in the position shown in Figs. 5 and 6. When the movement of the tone-arm across the record ceases for any reason, as for example, when the end of the record is reached, bevel gear 49 at once ceases to rotate, but the counter-clock-wise movement of bevel gear 66 continues. This continued rotation of bevel gear 66 not only causes pinion 47 to rotate on its axis in a counter-clock-wise direction, but, by reason of the fact that it meshes with stationary bevel gear 49, said pinion 47 begins to walk around bevel gear 49, thus removing the end of pin 44 from under the nose of latch 40. The bevel gear 49 thus serves as an abutment against which the pinion 47 reacts when power is applied by the gear 66. Spring 43 immediately withdraws latch 40 from the inverted V-shaped notch 34 in plunger 31, whereupon spring 33 forces said plunger toward the right, and, through connections heretofore described, effects the stopping of the machine. It will also be apparent that, if the speed of one of the bevel gears, 49 and 66, be materially varied with respect to the other, the same operation will result. Thus, if the speed of rotation of bevel gear 49 be materially decreased, as by a material decrease in the speed of traverse of the tone-arm, the more rapid rotation of bevel gear 66 will cause pinion 47 to walk around gear 49, removing the beveled end of member 44 from engagement with the latch, whereby plunger 31 will be actuated to stop the machine.

When it is desired to restart the machine, the tone-arm is moved to the position indicated in Fig. 1, dog 38 as it passes roller 37 moving around its pivot and away from stop 39. As heretofore stated, it is only when gear 61 is rotated in a clock-wise direction that bevel gear 49 is rotated at all, the return movement of the tone-arm to the starting position acting to rotate only gear 61, which has a slip connection (in the form of rollers 60) with plate 58.

When the parts are in the position shown in Fig. 1, the beveled end of pin 44 is out of operative engagement with the nose of the latch 40, and as the tone-arm is brought to the starting position, the rack on arm 21 engages the pinion 61 substantially at the instant dog 38 engages roller 37. The first effect of the rotation of pinion 61 by the rack is to cause a clock-wise rotation of bevel gear 49, which not only imparts rotation to bevel pinion 47, but also walks the same around bevel gear 66, which at that time is stationary, this rotation of the bevel pinion 47 continuing until the parts are in the position shown in Figs. 5 and 6. As the flat face of dog 38 presses upon roller 37 (Fig. 1), plunger 31 is forced to the left, and the movement of the parts is so timed that the inverted V-shaped notch 34 will come oppo-

site latch 40 just as the latter is forced upward by the engagement therewith of the beveled upper end of pin 44. At this time, the motor, whether spring or electric, commences to operate and rotates bevel gear 66 in a counter-clock-wise direction, at substantially the same speed that bevel gear 49 is being rotated in a clock-wise direction, this action of the bevel gears causing bevel pinion 47 to rotate on its axis, and the end of pin 44 to be held in engagement with the nose of latch 40. It will be observed that dog 38 readily passes beyond plunger 31, as shown in Fig. 3, and, as heretofore stated, it can, by reason of its yielding mounting, readily return to the position shown in Fig. 1.

It frequently happens that after the reproduction of a record is started, it is desired to have only the last part thereof reproduced, and often the operator will rapidly move the tone-arm across the record to the desired point. In machines heretofore employing start-and-stop mechanism operated from the tone-arm, such treatment was liable to cause injury, but by the present construction, the liability of damage by reason of rough usage is practically eliminated. Under the conditions above supposed, it is pointed out that the friction drive between gear 73 and disk 75 acts to prevent the speeded rotation of the bevel gears 49 and 66 (caused by the rapid movement of the tone-arm across the record by the operator) from being transmitted to the motor, thereby eliminating the danger of breakage to the mechanism due to this cause. Further, such speeded rotation of the gears which would tend to jam pin 44 against the nose of latch 40 with undue force, cannot have this effect for the reason that after such pin 44 reaches the end of slot 44' (Fig. 5) it cannot be further moved.

Preferably, boxing 42 is left open at the top to permit of the introduction of latch 40 and spring 43, and to permit the parts contained in said boxing and casing 51 to be readily inspected and oiled.

Not only can the device of the present invention be constructed at a fraction of the cost of start-and-stop mechanisms heretofore used, but it is highly effective in operation, and, so far as the efficiency of the device is concerned, it is immaterial that the number of threads to the inch on different records to be reproduced may vary largely. Further, by the device of the present invention, the machine is promptly stopped after the tone-arm ceases its movement across the record. In addition to this, the device is so simple and durable in construction as to practically eliminate the chance of injury by careless handling.

While for the purpose of clearness, one embodiment of the inventive idea has been herein described and illustrated in detail, it

is apparent that the invention is not restricted to the particular structural embodiment which is illustrated and described, but that it is susceptible of various embodiments conforming to the definition of the invention given in the claims which follow.

What is claimed is:—

1. The combination with a rotating element and a traveling element, of two members moved respectively by the said elements, a third member normally moved by the said two members and supplementally moved by one of them upon the stopping of the other, and a stop device actuated by said supplemental movement of the third member.

2. In combination, a motor, stop mechanism, a traveling element, a movable member connected to and moving therewith, a second movable member driven from the motor at the same speed as said first member but in the opposite direction, and connections between said members and the stop mechanism.

3. In combination, a motor, stop mechanism, a traveling element, a movable member connected to and moving therewith, a second movable member driven from the motor, a third movable member in mesh with the other two members, and connections between said third member and the stop mechanism.

4. In combination, a motor, stop mechanism, a traveling element, a movable member connected to and moving therewith, a second movable member driven from the motor at the same speed as said first member but in the opposite direction, a third movable member engaged by the other two members and connections between said third member and the stop mechanism.

5. In combination, a motor, stop mechanism, a traveling element, a movable member connected to and moving therewith, a second movable member driven from the motor, a third movable member continually meshing with and being rotated by the other two members, and connections between said third member and the stop mechanism.

6. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor at the same speed as said first member, and connections between said members and the stop mechanism.

7. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor at the same speed as but in a direction opposite to that of said first member, and con-

nections between said members and the stop mechanism.

8. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor at the same speed as said first member, a third rotatable member engaged by the other two members, and connections between said third member and the stop mechanism.

9. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor in a direction opposite to that of said first member, a third rotatable member meshing with the other two members, and connections between said third member and the stop mechanism.

10. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor at the same speed as said first member, a third rotatable member engaged and rotated by the other two members, and connections between said third member and the stop mechanism.

11. In combination, a motor, stop mechanism, a traveling element, a gear rotated by the movement of said traveling element, a gear rotated from said motor, a third gear meshing with said other two gears and rotated thereby, and connections between said third gear and the stop mechanism.

12. In combination, a motor, stop mechanism, a traveling element, a gear rotated by the movement of said traveling element, a second gear rotated from said motor in the opposite direction to that of said first gear, a third gear meshing with said other two gears and rotated thereby, and connections between said third gear and the stop mechanism.

13. In combination, a motor, a stop mechanism, a traveling element, a gear rotated by the movement of said traveling element, a second gear rotated from said motor at the same speed as said first gear, a third gear meshing with said other two gears and rotated thereby, and connections between said third gear and the stop mechanism.

14. In combination, a motor, stop mechanism, a traveling element, a bevel gear rotated by the movement of said traveling element, a second bevel gear rotated from said motor, a third bevel gear meshing with said other two bevel gears and rotated thereby, and connections between said third bevel gear and the stop mechanism.

15. In combination, a motor, stop mechanism, a traveling element, a bevel gear ro-

tated by the movement of said traveling element, a second bevel gear rotated from said motor in the opposite direction to that of said first bevel gear, a third bevel gear meshing with said other two bevel gears and rotated thereby, and connections between said third bevel gear and the stop mechanism.

16. In combination, a motor, stop mechanism, a traveling element, a bevel gear rotated by the movement of said traveling element, a second bevel gear rotated from said motor at the same speed as said first bevel gear, a third bevel gear meshing with said other two bevel gears and rotated thereby, and connections between said third bevel gear and the stop mechanism.

17. In combination, a motor, stop mechanism, a traveling element, an arm, connected thereto and moving therewith, a gear, connections between said arm and gear, a second gear rotated from the motor in the opposite direction to that of said first gear, a third gear meshing with said other two gears and rotated thereby, and connections between said third gear and the stop mechanism.

18. In combination, a motor, stop mechanism, a traveling element, an arm connected thereto and moving therewith, a rack on said arm, a bevel gear, connections between said gear and rack, a bevel gear rotated from the motor but in the opposite direction to that of said first gear, a bevel pinion meshing with said bevel gears and rotated thereby, and connections between said pinion and the stop mechanism.

19. In combination, a traveling element, a movable member connected to and movable therewith, a motor, a second movable member driven from said motor in the opposite direction to that of but at the same speed as said first member, a third member engaged and moved by the other two members, a movable element controlling the starting and stopping of the mechanism, and connections between said third member and said element.

20. In combination, a traveling element, a rotatable member connected to and rotatable therewith, a motor, a second rotatable member driven from said motor in the opposite direction to that of but at the same speed as said first member, a third member engaged and rotated by the other two members, a movable element controlling the starting and stopping of the mechanism, and connections between said third member and said element.

21. In combination, a traveling element, a movable member connected to and movable therewith, a motor, a second movable member driven from said motor in the opposite direction to that of but at the same speed as said first member, a third member engaged

and moved by the other two members, a movable element operated from the traveling element controlling the starting and stopping of the mechanism, and connections between said third member and said element. 70

22. In combination, a traveling element, a rotatable member connected to and rotatable therewith, a motor, a second rotatable member driven from said motor at the same speed as said first member, a third member engaged and rotated by the other two members, a movable element operated from the traveling element controlling the starting and stopping of the mechanism, and connections between said third member and said element. 75 80

23. In combination, a traveling element, a movable member connected to and movable therewith, a motor, a second movable member driven from said motor at the same speed as said first member, a movable element controlling the starting and stopping of the mechanism, a latch holding said element in its moved position, and means engaging said members and controlling the operation of the latch. 85 90

24. In combination, a traveling element, a movable member connected to and movable therewith, a motor, a second movable member driven from said motor in the opposite direction to that of said first member, a third member meshing with the other two members, a movable element controlling the starting and stopping of the mechanism, a latch holding said element in its moved position, and means connected to said third member controlling the operation of the latch. 95 100

25. In combination, a traveling element, a rotatable member connected to and rotatable therewith, a motor, a second rotatable member driven from said motor in the opposite direction to that of but at the same speed as said first member, a third member engaged and rotated by the other two members, a movable element controlling the starting and stopping of the machine, and connections between said third member and said element including a latch holding said element in its moved position and means connected to said third member controlling the operation of the latch. 105 110 115

26. In combination, a traveling element, an arm connected thereto, a gear, a pinion and rack connection between said gear and arm, a motor, a second gear driven therefrom, a pinion meshing with said gears and rotated thereby, a movable plunger controlling the starting and stopping of the mechanism, means carried by said arm for engaging and moving said plunger, a latch holding said plunger in its moved position, and means connected to said last named pinion controlling the operation of the latch. 120 125

27. In combination, a traveling element, an arm connected thereto, a bevel gear, a pinion and rack connection between said bevel gear and arm, a motor, a second bevel gear driven therefrom, a bevel pinion meshing with said bevel gears and rotated thereby, a movable plunger controlling the starting and stopping of the mechanism, means carried by said arm for engaging and moving said plunger, a latch holding said plunger in its moved position, and means connected to said bevel pinion controlling the operation of the latch.

28. In combination, a traveling element, an arm connected thereto, a gear, a pinion and rack connection between said gear and arm, means whereby said gear is rotated only in one direction, a motor, a second gear driven therefrom, a pinion meshing with said gears and rotated thereby, stop mechanism, and connections between said last named pinion and said stop mechanism.

29. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor, means whereby said first-named member is rotated only in one direction, a third rotatable member engaged by the other two members, and connections between said third member and the stop mechanism.

30. In combination, a motor, stop mechanism, a traveling element, a movable member connected to and moving therewith, means whereby said member is moved only in one direction, a second movable member driven from the motor, and connections between said members and the stop mechanism.

31. In combination, a motor, stop mechanism, a traveling element, a movable member connected to and moving therewith, means whereby said member is moved only in one direction, a second movable member driven from the motor, a third movable member engaged by the other two members, and connections between said third member and the stop mechanism.

32. The combination with a rotating element and a traveling element, of two members moved respectively by said elements, a third member normally moved by said two members and supplementally moved by one of them upon the stopping of the other, a stop device, and stop-controlling means operated by said supplemental movement of the third member.

33. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor, a friction drive between said second rotatable member and motor, a third rotatable member engaged by the other two members, and

connections between said third member and the stop mechanism.

34. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor, and a third rotatable member engaged by the other two members and being movable as a whole with respect to one of said other members to stop the machine.

35. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor, a third rotatable member mounted on a pivoted pin and meshing with the other two members, said third member moving as a whole with respect to one of said other members when the latter ceases to rotate, and connections between said third member and the stop mechanism.

36. In combination, a motor, stop mechanism, a traveling element, a bevel gear rotated by the movement of said traveling element, a second bevel gear rotated from said motor, a third bevel gear carried by a pivoted pin meshing with said other two bevel gears and rotated thereby, and connections between said third bevel gear and the stop mechanism.

37. In combination, a motor, a traveling element, a bevel gear rotated by the movement of said traveling element, a second bevel gear rotated from said motor, a third bevel gear carried by a pivoted pin meshing with said other two bevel gears and rotated thereby, a movable element controlling the starting and stopping of the machine, and a latch for holding said element in its inoperative position, and adapted to be engaged by said pivoted pin.

38. In combination, a motor, stop mechanism, a traveling element, a rotatable member connected to and rotated by the movement of said traveling element, a second rotatable member driven from the motor, a friction drive between one of said rotatable members and its source of movement, a third rotatable member engaged by the other two members, and connections between said third rotatable member and the stop mechanism.

39. The combination with a rotating element and a traveling element, of a stop mechanism comprising two engaging rotary members connected to the said rotating and traveling elements respectively, one of the said members while remaining in normal engagement with the other serving to effect the stopping of the rotating element upon the stopping of the traveling element.

40. The combination with a rotating element and a traveling element, of a stop mechanism comprising a rotary abutment

movable with the traveling element and means operatively connected with the rotating element and upon the stopping of the traveling element reacting against the abutment to effect the stopping of the rotating element.

41. The combination with a rotating element and a traveling element, of a stop mechanism comprising a member normally held against movement, a rotary abutment movable with the traveling element, and means operating by reaction against the abutment upon the stopping of the traveling element to move the said member to effect the stopping of the rotating element.

42. The combination with a rotating element and a traveling element, of two members moved respectively by said elements, a third member normally moved by said two members and supplementarily moved by one of them upon a predetermined variation in speed of the other, and a stop device actuated by said supplemental movement of the third member.

43. The combination with a rotating element and a traveling element, of two members moved respectively by said elements, and a third member normally moved by said two members and supplementarily moved by one of them upon the speed of the other decreasing below a predetermined limit, a stop device actuated by said supplemental movement of the third member.

44. The combination with a rotating element and a traveling element, of a stop mechanism comprising a rotary abutment movable with the traveling element, and means operatively connected with the rotating element and reacting against the abutment upon a predetermined variation in speed of said traveling element to effect the stopping of the rotating element.

45. The combination with a rotating element and a traveling element, of a stop mechanism comprising a rotary abutment movable with the traveling element, and means operatively connected with the rotating element and reacting against the abutment upon a decrease in speed of said traveling element below a predetermined limit to effect the stopping of the rotating element.

46. In combination with a rotating element and a traveling element, of stop mechanism, differential gearing in operative relation with said elements respectively, and means operated by said gearing and actuating said stop mechanism upon the speed of predetermined limit.

47. The combination with a rotating element and a traveling element, of stop mechanism, a member normally held against bodily movement and controlling said stop mechanism, and rotary means operated

from said elements and in continuous engagement with said member to actuate said member upon the stopping of said traveling element.

48. The combination with a rotating element and a traveling element, of stop mechanism, a member normally held against bodily movement and controlling said stop mechanism, and rotary means operated from said elements and in continuous engagement with said member to move said member bodily upon the speed of one of said elements decreasing below a predetermined limit.

49. The combination with a rotating element and a traveling element, of stop mechanism, a member normally held against bodily movement and controlling said stop mechanism, and rotary means operated from said elements and in contiguous engagement with said member to move said member bodily upon the speed of said traveling element decreasing below a predetermined limit.

50. The combination with a rotating element and a traveling element, of stop mechanism, a member controlling said stop mechanism, and rotary means operated by said elements and in continuous engagement with said member to actuate said member upon a predetermined variation in speed of one of said elements.

51. The combination with a rotating element and a traveling element, of stop mechanism, a member controlling said stop mechanism, and rotary means operated by said elements and in continuous engagement with said member to actuate said member upon the speed of one of said elements decreasing below a predetermined limit.

52. The combination with a rotating element and a traveling element, of stop mechanism, a member controlling said stop mechanism, and rotary means operated by said elements and in continuous engagement with said member to actuate said member upon the stopping of one of said elements.

53. The combination with a rotating element and a traveling element, of stop mechanism, a member controlling said stop mechanism, and rotary means operated by said elements and in continuous engagement with said member to actuate said member upon a predetermined variation in speed of said traveling element.

54. The combination with a rotating element and a traveling element, of stop mechanism, a member controlling said stop mechanism, and rotary means operated by said elements and in continuous engagement with said member to actuate said member upon the speed of said traveling element decreasing below a predetermined limit.

55. The combination with a rotating element and a traveling element, of stop mechanism, a member controlling said stop mechanism, and rotary means operated

anism, a member controlling said stop mechanism, and rotary means operated by said elements and in continuous engagement with said member to actuate said member upon the stopping of said traveling element.

56. In combination with a motor and a traveling element, start-and-stop mechanism, means moving with the traveling element, and a spring-pressed dog pivoted on said means and adapted to actuate said stop mechanism to start the motor upon movement of said means in one direction only.

57. In combination, a traveling element, a movable member connected to and movable therewith, a motor, a second movable member driven from said motor in the opposite direction to that of said first member, a third member engaged and moved by the other two members, a movable element operated from the traveling element controlling the starting and stopping of the mechanism, and connections between said third member and said element.

58. In combination, a traveling element, a movable member connected to and movable therewith, a motor, a second movable member driven from said motor at the same speed as said first member, a third member engaged and moved by the other two members, a movable element operated from the traveling element controlling the starting and stopping of the mechanism, and connections between said third member and said element.

59. In combination, a traveling element, a movable member connected to and movable therewith, a motor, a second movable member driven from said motor, a third member engaged and moved by the other two members, a movable element controlling the starting and stopping of the mechanism, means moved by the traveling element for operating said movable element, and connections between said third member and said element.

60. In combination, a traveling element, a member connected to move therewith, a motor, a second member driven from the motor at the same speed as said first member, stop mechanism, and connections between said members and said stop mechanism.

61. The combination with a rotating element and a traveling element, of a member moved in one direction by said traveling element, a second member moved in the opposite direction by said rotating element, means engaged and moved by both of said members and supplementally moved by one of them upon the stopping of the other, and

a stop device actuated by said supplemental movement of said last-named means.

62. The combination with a rotating element and a traveling element, of a stop mechanism comprising an abutment moved by the traveling element, and means rotated by the rotating element and reacting against said abutment upon the stopping of the traveling element to effect the stopping of the machine.

63. The combination with a rotating element and a traveling element, of an abutment moved by said traveling element, means moved by said rotating element and adapted to cooperate with said abutment, stop mechanism, and controlling means for said stop mechanism actuated by the reaction of said means on said abutment.

64. In combination with a traveling element and a rotating element, an abutment moved by said traveling element, means moved by said rotating element and adapted to cooperate with said abutment, stop mechanism, and means whereby upon the stopping of said traveling element the reaction of said first-named means on said abutment effects the actuation of said stop mechanism.

65. In a phonograph, a record, a reproducer movable across the same, a cut-off device for discontinuing the movement of the record, and differential mechanism operated by the lateral movement of the reproducer and the rotatable movement of the record for controlling said cut-off device.

66. In a phonograph, a record, a reproducer movable across the same, a normally inoperative cut-off device for discontinuing the movement of the record, and differential gearing driven from the reproducer and the record operable to set the cut-off device when the reproducer ceases its lateral movement.

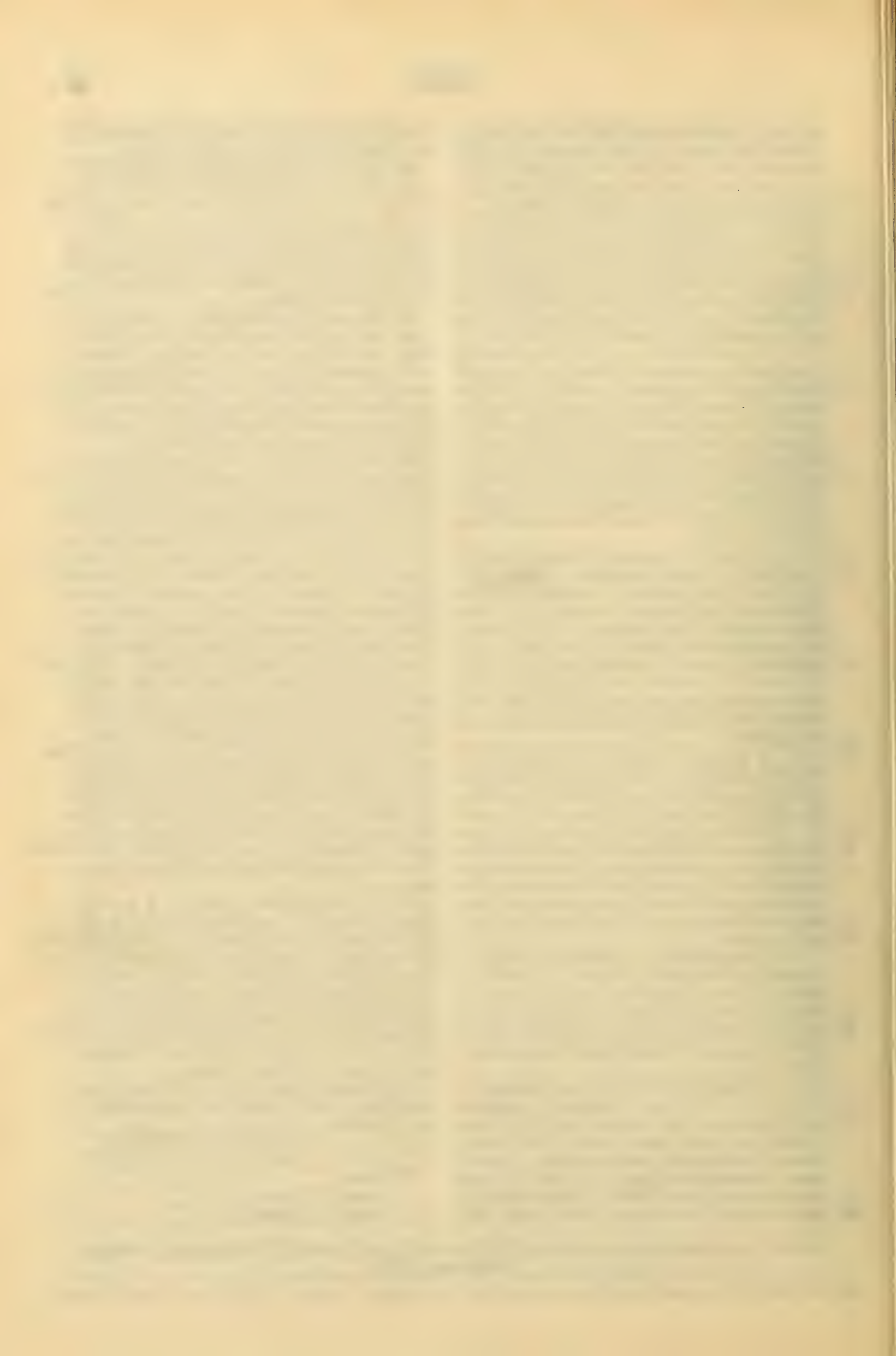
67. In combination, a motor, a member driven thereby, a traveling element, a second member moved thereby, a connection between said second member and the traveling element permitting reverse movement of the traveling element independently of said second member, stop mechanism, and means coacting with said members for actuating said stop mechanism upon the stopping of said traveling element.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

CLINTON E. WOODS.
FRANK C. HINCKLEY.

Witnesses:

JOHN R. PETRIE,
JOHN S. GRIFFITH.



GUIDING DEVICE FOR PHONOGRAPH TONE-ARMS.

1,264,691 ----- J. A. Shoemaker,
Filed May 22, 1917,
Patented Apr. 30, 1918.

J. A. SHOEMAKER.
GUIDING DEVICE FOR PHONOGRAPH TONE ARMS.
APPLICATION FILED MAY 22, 1917.

1,264,691.

Patented Apr. 30, 1918.

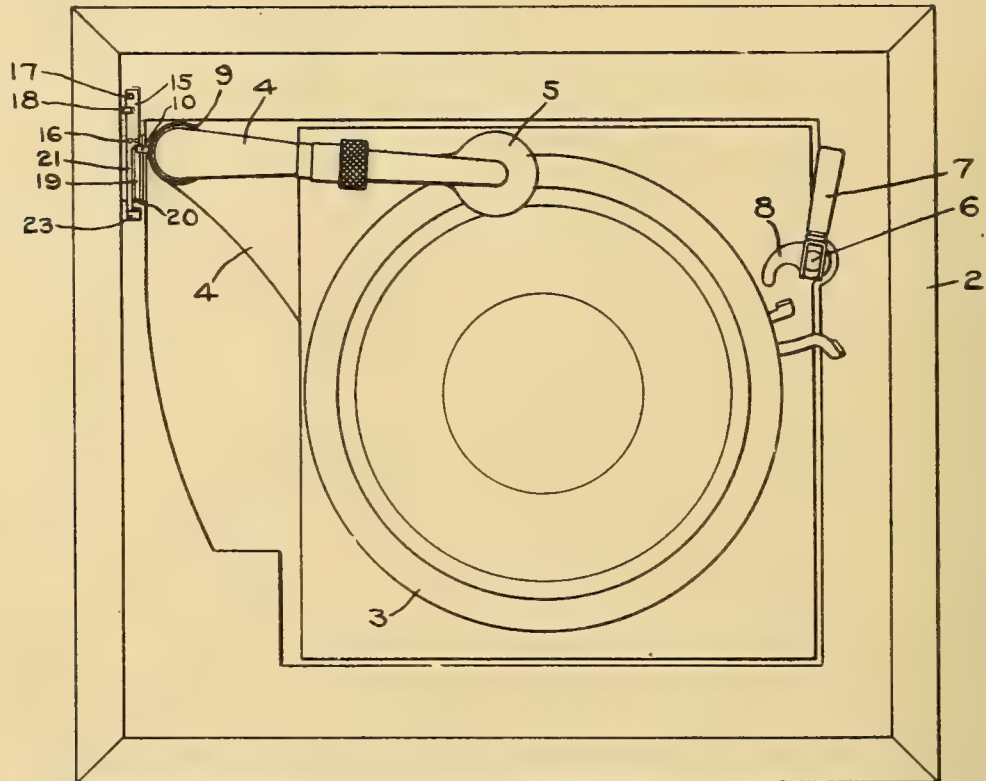


FIG-1

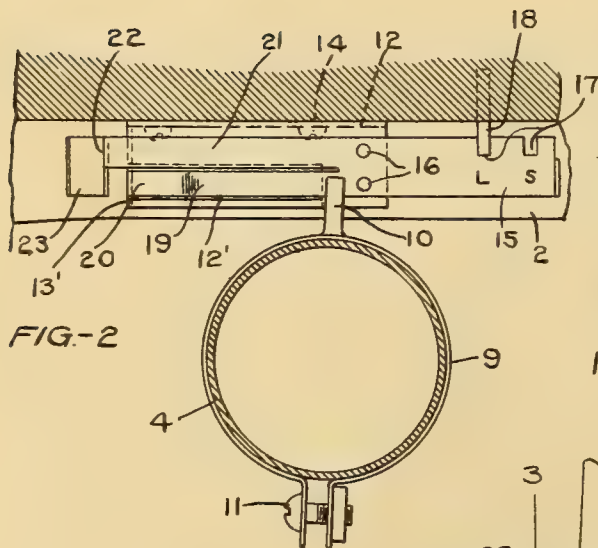


FIG-2

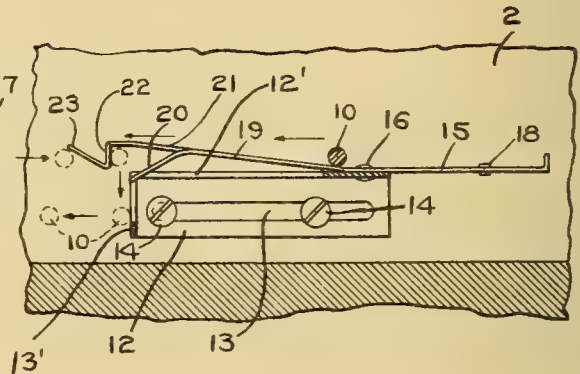


FIG-3

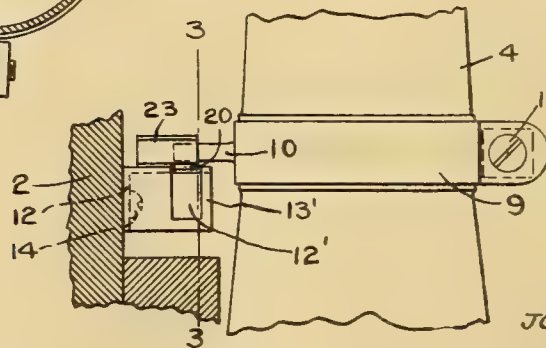


FIG-4

WITNESSES:
B. Hall.
E. A. Paul

INVENTOR:
JOHN A. SHOEMAKER
BY
Paul & Paul
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN A. SHOEMAKER, OF ADA, MINNESOTA.

GUIDING DEVICE FOR PHONOGRAPH TONE-ARMS.

1,264,691.

Specification of Letters Patent.

Patented Apr. 30, 1918.

Application filed May 22, 1917. Serial No. 170,315.

To all whom it may concern:

Be it known that I, JOHN A. SHOEMAKER, a citizen of the United States, resident of Ada, county of Norman, State of Minnesota, have invented certain new and useful Improvements in Guiding Devices for Phonograph Tone-Arms, of which the following is a specification.

The object of my invention is to provide means for automatically locating the position of the tone arm and the diamond point or needle with respect to the starting point of the groove or path in the record, the device having particular application to the Edison phonograph where the tone arm is raised and lowered to separate the diamond point from the record or position it thereon preparatory to the operation of the machine.

The invention consists generally in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a plan view of the top of an Edison phonograph with my invention applied thereto,

Fig. 2 is a plan sectional view of the horn arm, with my invention connected therewith,

Fig. 3 is a detail sectional view, taken on the line 3—3 of Fig. 4, showing a portion of the device mounted on the wall of the cabinet,

Fig. 4 is an elevation of the horn arm and a section of the cabinet, showing the relative arrangement of the path-finding device thereon.

In the drawing, 2 represents the cabinet of the phonograph, 3 the record turn-table and 4 the tone arm having the usual sound box 5 and point or needle, not shown. On one side of the machine is the shaft 6 connected with the arm and a lever 7 for raising or lowering the shaft and operating the arm, which is connected with the shaft under the turn-table in the well known way common to machines of this type. In connection with the shaft 6 is an automatic stopping device 8 in general use.

Upon the tone arm I provide a clamp 9 having a pin 10 thereon projecting horizontally toward the casing of the machine. This clamp is secured by a bolt 11 or by other suitable means and in practice the pin may be formed directly on the arm itself,

if desired. 12 is a plate, having a longitudinal slot 13 therein to receive screws 14 on which said plate is slidable horizontally. The plate 15 is secured at 16 on the plate 12 and has notches 17 therein to receive a pin 18 mounted in the wall of the casing. These recesses indicate the different adjustments of the plate 12 for long and short records, that is, twelve or ten inches, the position of the recesses being accurately determined by previous measurement and adjustment.

The plate 15 is split longitudinally to form a spring section 19 having a downwardly turned end portion 20 and a section 21 having a substantially right angled end portion 22 terminating in an upwardly inclined part 23. The part 22 forms a square shoulder at the end of the spring 21 and projects inwardly across the end part 20 in the path of the pin 10, which is mounted to engage and depress the plate 19. There is sufficient space between the part 22 and the end 20 to allow the pin 10 to drop down between them and the tone arm 4 be depressed sufficiently to engage the diamond point with the groove in the record. This space or gap between the parts 22 and 20 is so positioned by the adjustment of the plate 12 that when the arm is dropped or lowered by the movement of the lever 7, it will always bring the diamond point or needle at the starting point of the record without any further attention on the part of the operator. The plate 12 is provided with a slot 12' for the spring 19 and has a flange 13' to serve as a stop for the pin 10 to prevent backward movement. After the record has been played and the arm is returned to its initial position, the pin 10 will strike the upwardly turned end 23, lifting the plate sufficiently to clear the angle part 22 and then riding over the plate 19 to the starting part of the arm. When a new record has been placed in the machine, it will only be necessary to swing the arm against the stop 22 when the lever 7 may be operated to drop the arm upon the record. In case of a change in the size of the record to be played, the plate 12 is moved lengthwise on its supports 14, shifting from one notch 17 to the other on the pin 18, according to whether the record to be played is larger or smaller.

In practice, the pin 10 may be integrally formed on the arm, where the invention is applied to a machine when it is built, but for machines already constructed, I may use the

clamp 9, securing it by suitable means, such as the bolt 11.

In various ways the details of construction herein shown and described may be modified and still be within the scope of my invention.

I claim as my invention:

1. The combination with a phonograph turn-table, of a tone arm comprising a horizontal part extending over the turn-table and a downwardly turned part extending below the table, and a stop so positioned in relation to the downwardly extending part of the tone arm that when the tone arm is raised and in position to be lowered onto the record said stop and a part of said arm will co-act with each other to position the stylus of the arm over the starting point of the record groove, said stop and part of the arm being out of co-acting relation when the arm is lowered.

2. The combination, with a phonograph turn table, of a tone arm mounted for vertical movement comprising a horizontal part extending over the turn table and a downwardly turned part extending below the turn table, and means adjustably mounted and coöperating with said downwardly turned part for guiding said arm to the starting point in the groove of the record.

3. The combination, with a phonograph turn-table, of an oscillating tone arm, a pin mounted on said arm and plates in the path of said pin having means for checking the oscillation of said arm but permitting movement thereof toward the record.

4. The combination, with a phonograph turn-table and oscillating tone arm, of a pin mounted on said arm, a spring member having a shoulder in the path of said pin for checking the horizontal movement of said arm at a point above the normal starting position of said arm on a record.

5. The combination, with a phonograph turn-table, of an oscillating tone arm, a spring member having a shoulder formed thereon, a pin mounted on said arm to engage said shoulder when said arm is oscillated in one direction, and said spring member having an inclined surface for contact with said pin to allow said arm to be moved past said shoulder when it is oscillated in the opposite direction.

6. A device for positioning a phonograph tone arm comprising a plate having spring members thereon, one of said members projecting beyond the other one and having a shoulder formed thereon with a gap between said shoulder and the adjacent end of the other member, a pin mounted on said tone arm and positioned to slide on one member and engage the shoulder on said other member to limit the oscillation of said arm in one direction, said arm having means for lowering it through said gap upon the record when said pin contacts with said shoulder and said shoulder having an inclined surface on one side in the path of said pin on its return stroke for lifting said spring member to allow said pin to return to its normal position.

7. The combination, with a phonograph turn table and its support, of a tone arm mounted to slide vertically in said support and having a part to overhang said turn table, and means coöperating with the rear portion of said tone arm for guiding said overhanging part to the beginning of the groove in the record.

In witness whereof, I have hereunto set my hand this 18th day of May, 1917.

JOHN A. SHOEMAKER.

Witnesses:

GUS GUSTAFSON,
A. O. GUREN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

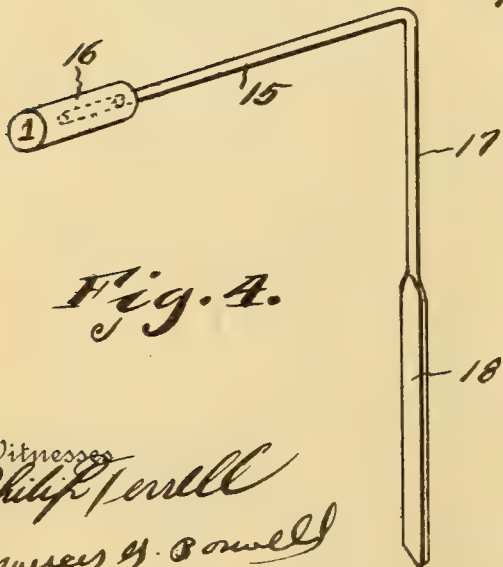
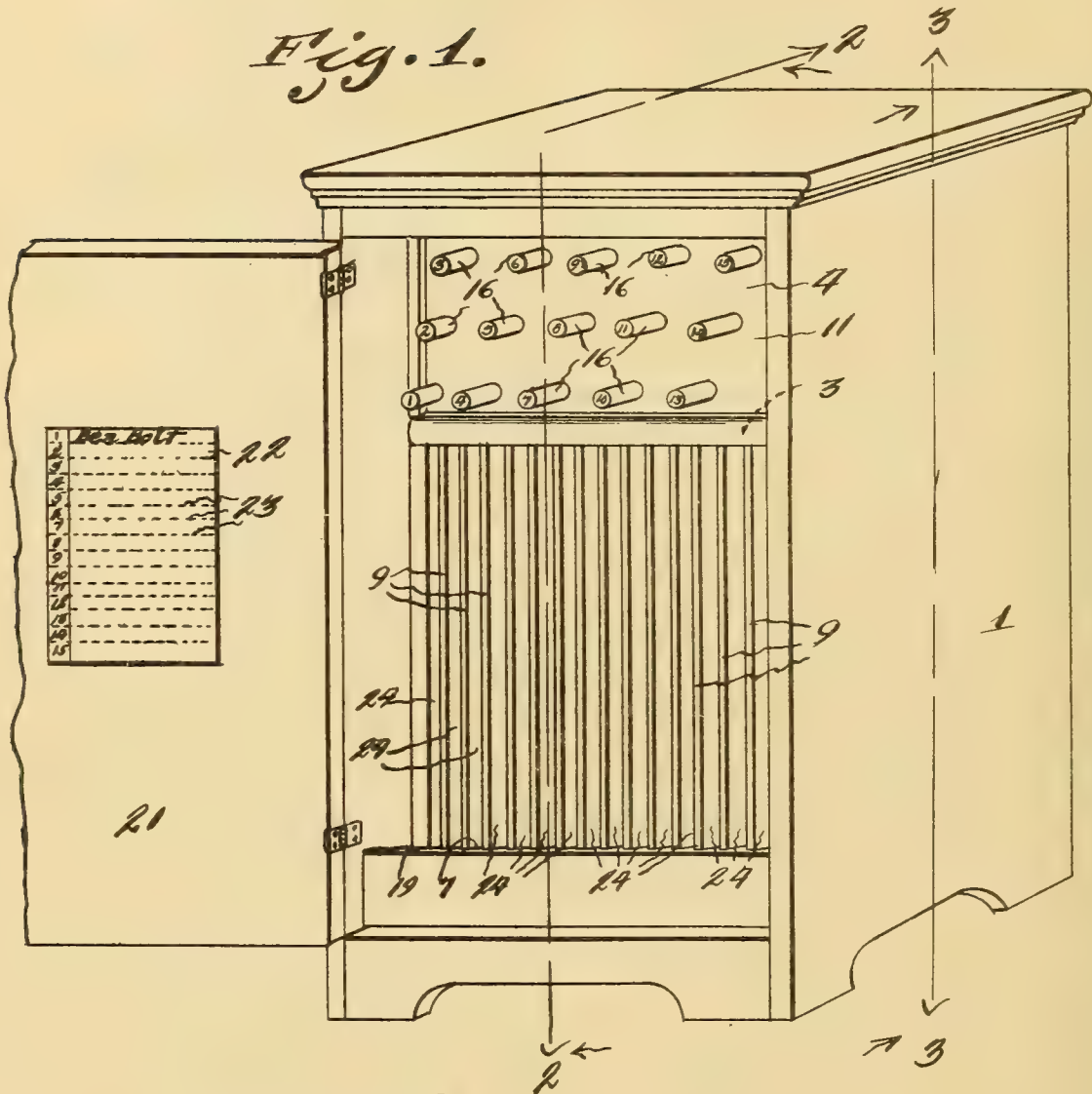
PHONOGRAPH RECORD CABINET.

1,264,851 ----- H.H. Pemberton & C.A. Moore.
Filed May 17, 1916,
Patented Apr. 30, 1918.

H. H. PEMBERTON & C. A. MOORE.
 PHONOGRAPH RECORD CABINET.
 APPLICATION FILED MAY 17, 1916.

1,264,851.

Patented Apr. 30, 1918.
 2 SHEETS—SHEET 1.



Witnesses
Philip Perrell
Francis H. Bowell

By

Inventors
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and C. A. Moore
D. Swift & Co.
 their Attorneys

H. H. PEMBERTON & C. A. MOORE.
 PHONOGRAPH RECORD CABINET.
 APPLICATION FILED MAY 17, 1916.

1,264,851.

Patented Apr. 30, 1918.
 2 SHEETS—SHEET 2.

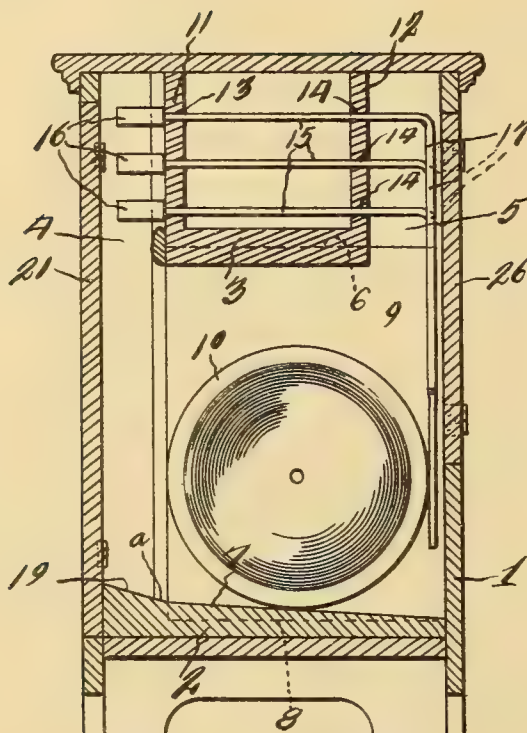


Fig. 2.

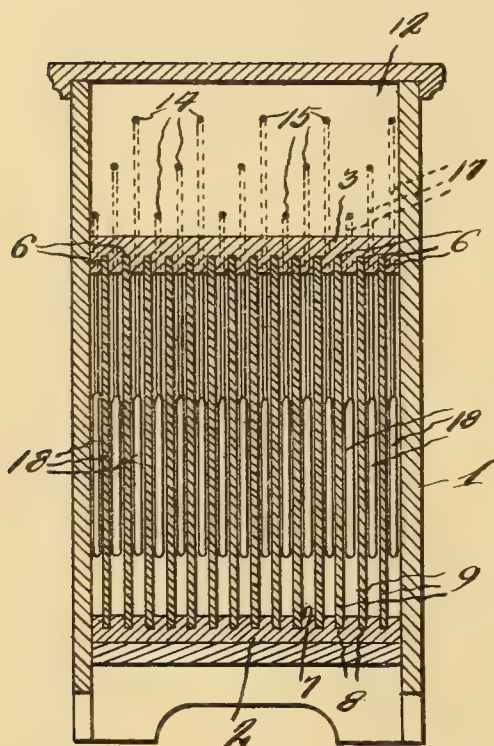


Fig. 3.

Witnesses
Philip H. Hull
Frances H. D. Hull

By

Inventors
H. H. Pemberton
C. A. Moore
D. Swift & Co.
 their Attorneys

UNITED STATES PATENT OFFICE.

HARRY H. PEMBERTON AND CHARLES A. MOORE, OF ROSEVILLE, OHIO.

PHONOGRAPH-RECORD CABINET.

1,264,851.

Specification of Letters Patent.

Patented Apr. 30, 1918.

Application filed May 17, 1916. Serial No. 98,084.

To all whom it may concern:

Be it known that we, HARRY H. PEMBERTON and CHARLES A. MOORE, citizens of the United States, residing at Roseville, in the county of Muskingum, State of Ohio, have invented a new and useful Phonograph-Record Cabinet; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the art of cabinets, and more particularly to a cabinet for talking machine records, disk records that are used upon victrolas and grafonolas and similar machines.

One of the objects of the invention is to provide a cabinet having a plurality of compartments to hold the disk records, there being a plurality of pull rods mounted in guides of the cabinet and provided with downwardly extending arms, disposed in the rear of the edges of said records, whereby upon pulling any one of the rods, the record (which may be listed corresponding to the number of the rod) will be discharged from its respective compartment. A list of records numbered according to the numerals upon the pull buttons of the rods may be carried by the inner face of the door of the cabinet.

In practical fields the details of construction may necessitate alterations falling within the scope of what is claimed.

The invention comprises further features and combination of parts as hereinafter set forth, shown in the drawings and claimed.

In the drawings,

Figure 1 is a view in perspective of the improved record cabinet constructed in accordance with the invention.

Fig. 2 is a vertical sectional view on line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view on line 3—3 of Fig. 1 at right angles to Fig. 2.

Fig. 4 is a detail perspective view of one of the pull rods.

Referring more especially to the drawings 1 designates a cabinet, preferably rectangular in contour, which is provided with a bottom 2 and a horizontal partition 3 spaced considerably above the bottom. This partition 3 is connected to the opposite sides of the cabinet in any suitable manner, but is somewhat shorter than the depth of the cabinet, thereby forming spaces 4 and 5 for-

wardly and rearwardly. The under face of the partition 3 is provided with a plurality of grooves 6 arranged in parallelism with each other and at spaced intervals. The upper face 7 of the bottom 2 is slightly upwardly inclined toward the forward portion of the cabinet to the point as indicated at *a*, beyond which the bottom is inclined forwardly and upwardly at a greater angle than the first inclined portion, so as to act as a stop for the record, as it is rolled out on its edge. The bottom 2 is provided with a plurality of grooves 8 arranged in parallelism, and at spaced intervals corresponding to the spaced intervals of the grooves 6. Secured in the grooves 6 and 8 are the upper and lower edges of a plurality of vertical partitions 9, forming compartments for disk records 10. Rising upwardly from the forward and rear portions of the horizontal partition 3 are partition walls 11 and 12 having a plurality of axially alined apertures or openings 13 and 14. Arranged in said guide openings or apertures 13 and 14 is a plurality of pull rods 15 having their forward ends provided with knobs or buttons 16, and their rear portions terminating in downwardly extending arms 17 having flattened portions 18, which fit edge-wise in the rear of the record compartment, so that the rear edges of the records will contact with the front faces of said flattened portions, whereby when any one of said rods is pulled, its respective arm 17 will discharge or move a record until the inclined part 19 of the bottom will limit the record in its movement. The knobs or buttons 16 are so spaced from the bend where the arms 17 depend from the body of the rods 15, that when said rods are pushed back in place, the arms 17 are held spaced from the back of the cabinet whereby as the records are inserted in their compartments the arms 17 will cushion the records, thereby relieving the sudden jar on the records. A record having been pushed forwardly to be limited by the inclined surface 19 it may be easily grasped and removed from its compartment. As shown there are fifteen compartments, therefore the knobs or buttons are numbered accordingly (1 to 15 inclusive), and arranged on the inner face of the front closure 21 is a chart 22 having a plurality of lines 23 numbered (1 to 15 inclusive) corresponding to the knobs or buttons. The titles of the records are written upon the lines 23, and the records

are placed in the compartments 24, so that their titles would correspond to the numbers adjacent the lines 23 and numbers on the buttons or knobs. Therefore, should the
5 record entitled "Ben Bolt" (which is written on the first line of the chart) be desired, the operator pulls the button numbered 1, in which case the downwardly extending arm 17 of said pull rod will discharge the
10 record "Ben Bolt" from its respective compartment, until it is limited by the inclined surface 19, thereby enabling the record to be grasped by the hand of the operator. Each of the other records that may be in
15 the compartments may be removed in a like manner. The rear of the cabinet is provided with a hinge closure 26, which may be opened should any of the pull rods and their arms need repairs.

20 The invention having been set forth, what is claimed as new and useful is:—

In combination with a disk record cabinet, the top of which has a depending part spaced

between the front and rear walls of the cabinet, said depending part having oppositely
25 arranged alined guides, a plurality of record ejectors, each ejector comprising right angle extending arms, one extending horizontally and mounted in a pair of said directly opposite guides, the other arm depending down-
30 wardly and being resilient, and means on the end of the horizontal arm adapted to engage the front of said depending part so as to hold the depending arm spaced from
35 the back of the cabinet for cushioning the record as it reaches its normal position in its compartment of the cabinet.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HARRY H. PEMBERTON.
CHARLES A. MOORE.

Witnesses:

THOMAS OSCAR STINE,
OLA M. DAW.

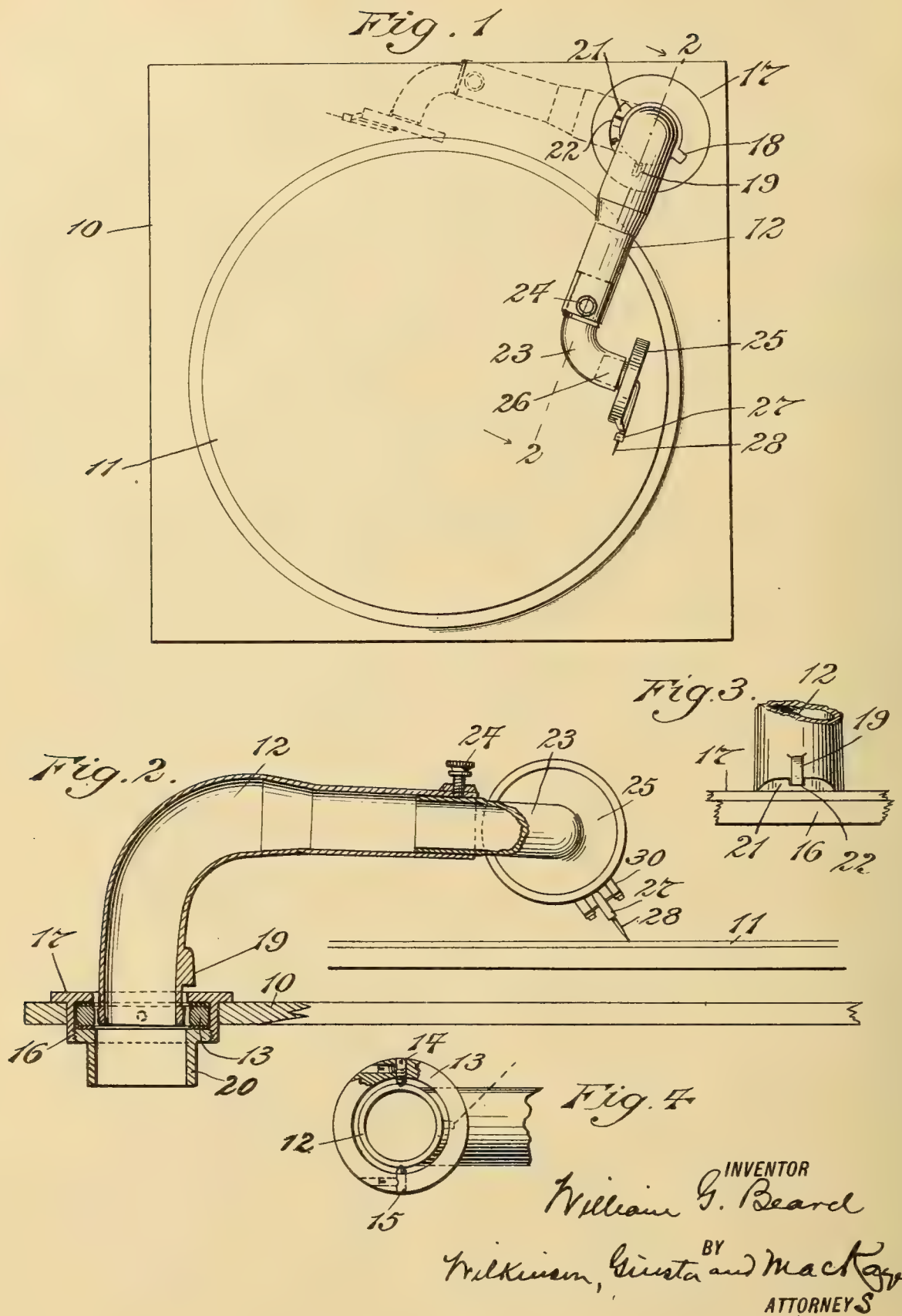
Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE.

1,264,883 ----- W. C. Beard,
Filed July 24, 1915,
Patented May 7, 1916.

1,264,883.

Patented May 7, 1918.



UNITED STATES PATENT OFFICE.

WILLIAM G. BEARD, OF NEW YORK, N. Y., ASSIGNOR TO HENRY C. BURNSTINE, OF
NEW YORK, N. Y.

TALKING-MACHINE.

1,264,883.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed July 24, 1915. Serial No. 41,645.

To all whom it may concern:

Be it known that I, WILLIAM G. BEARD, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Talking-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to certain improvements in means for reproducing sound, and more particularly in such as employ a rotating disk record.

The object of the invention is to provide an improved mounting for the tone arm whereby the necessary movements thereof are facilitated, and assembling of the various parts is simplified.

The invention is illustrated in a preferred form in the accompanying drawings, wherein Figure 1 is a plan view of the top of a machine employing my invention, Fig. 2 is a sectional view on the line 2—2 in Fig. 1, Fig. 3 shows a detail in elevation, and Fig. 4 is a bottom plan view of the tone arm gimbal removed.

In the drawings the top of a phonograph box is shown at 10, and at 11 is shown a disk record driven by suitable means within the box. In the form shown the usual bent tone arm 12 leads to an opening in one corner of the top, where it is supported by an improved mounting for permitting easy assembling while providing for a suitable degree of universal movement to accommodate the irregularities of the record and permit due movement of the sound box toward and across the record.

For these purposes the wide end of the tone arm is surrounded by a flat gimbal ring 13, to which it is pivoted by oppositely placed screws 14, 15. An inverted cup 16, with an internal screw thread, is inserted through the opening in the top 10, and is preferably provided with an annular flange 17 overlying said top.

The bottom of the cup 16 has a notch or opening 18, just large enough to permit passage of the lug 19 on the side of the tone arm.

In putting the tone arm in place, its wide end is thrust downward through the top of

the cup (the projection 19 passing through the opening 18) until such end projects far enough beyond the cup to permit the gimbal ring 13 to be applied in the manner shown in Fig. 4. The whole is then drawn up into the position shown in Fig. 2, where the gimbal ring 13 is secured (preferably between felt washers as shown) by means of the flanged tubular securing member 20 which screws up into the cup 16. This tubular securing member serves to afford a connection with such further passages (if any) as may be intended to receive and convey the sounds produced in the sound box.

The opening in the bottom of the cup 16 through which the end of the tone arm passes is large enough to permit said arm to be tilted on its pivotal screws 14, 15. At the same time the ring 13 is permitted to slip around in its own plane, thereby providing, in combination with the pivotal attachment, a universal movement. The tilting movement of the tone arm has sufficient scope to permit the lug 19 to ride up the sloping side of the lifting ridge 21, when the arm is turned into the dotted line position of Fig. 1. In this position the lug 19 occupies the notch 22 in the ridge 21, whereby it is securely held. When in playing position, as for instance shown in Fig. 1, the lug 19 moves a little distance above the flange 17, so as to permit the vertical play required by any irregularities in the record.

Various changes may be made in my improved construction without departing from the scope of my invention, and I do not limit myself to the details herein shown and described.

What I claim is—

In apparatus for reproducing sounds, and in combination with the usual record supporting casing having an opening in its top for the tone arm, an inverted cup in said opening having a notched bottom carrying a lifting ridge, a tone arm having a lug adapted to pass through said notch in the bottom and to rest on said ridge, a gimbal ring in said cup connected by pivots with said tone arm, and a securing ring for said gimbal ring screwing into said cup, substantially as described.

In testimony whereof, I have affixed my signature.

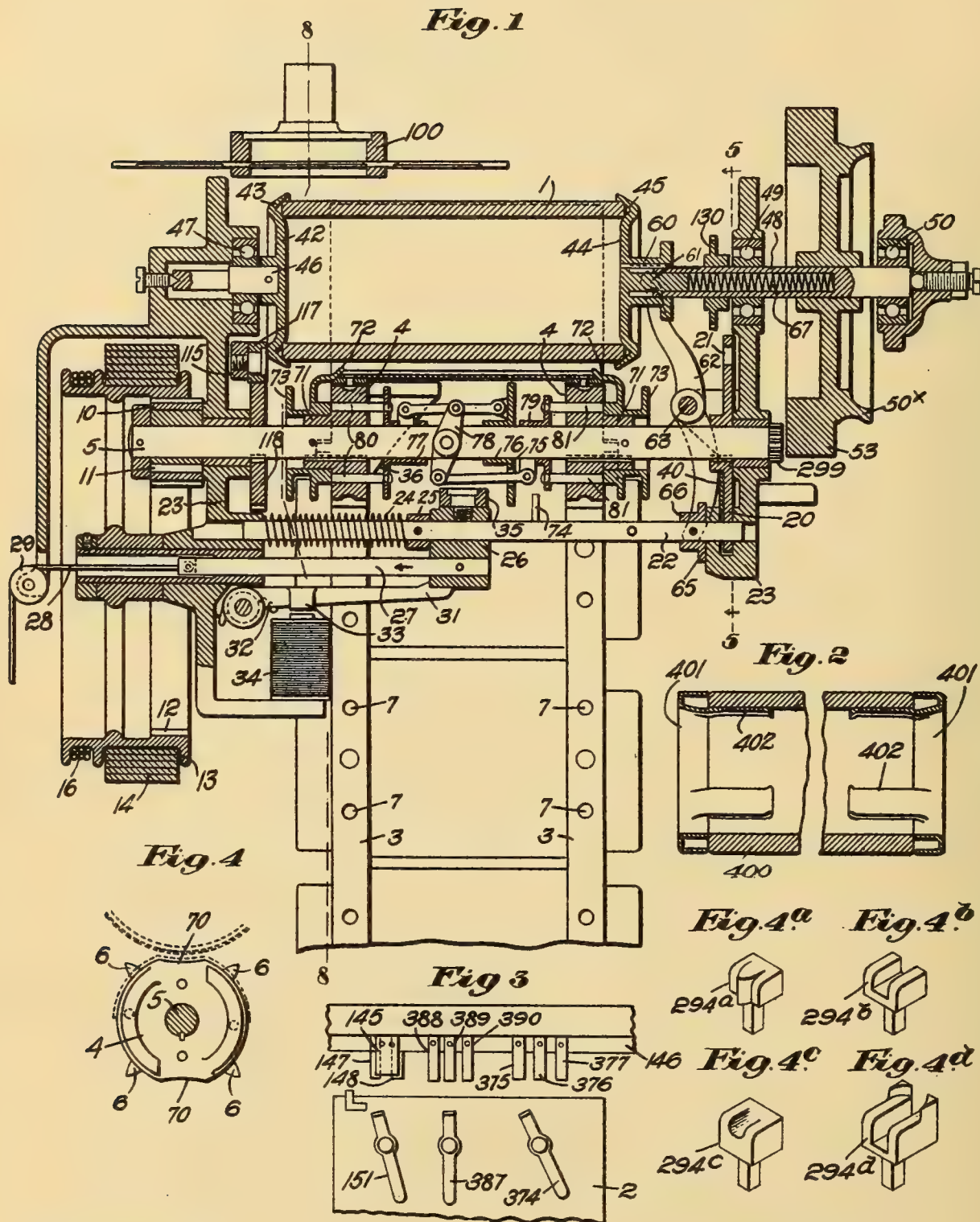
WILLIAM G. BEARD.

PHONOGRAPH.

1,265,009 ----- C. H. Underhill,
Filed Apr. 29, 1911,
Patented May 7, 1918.

1,265,009.

Patented May 7, 1918.
 9 SHEETS—SHEET 1.



Witnesses:
 Robert H. Kammeler.
 Carl L. Choate.

Inventor:
 George H. Underhill,
 by Emory Dorth, James Karmay
 Attys.

G. H. UNDERHILL.

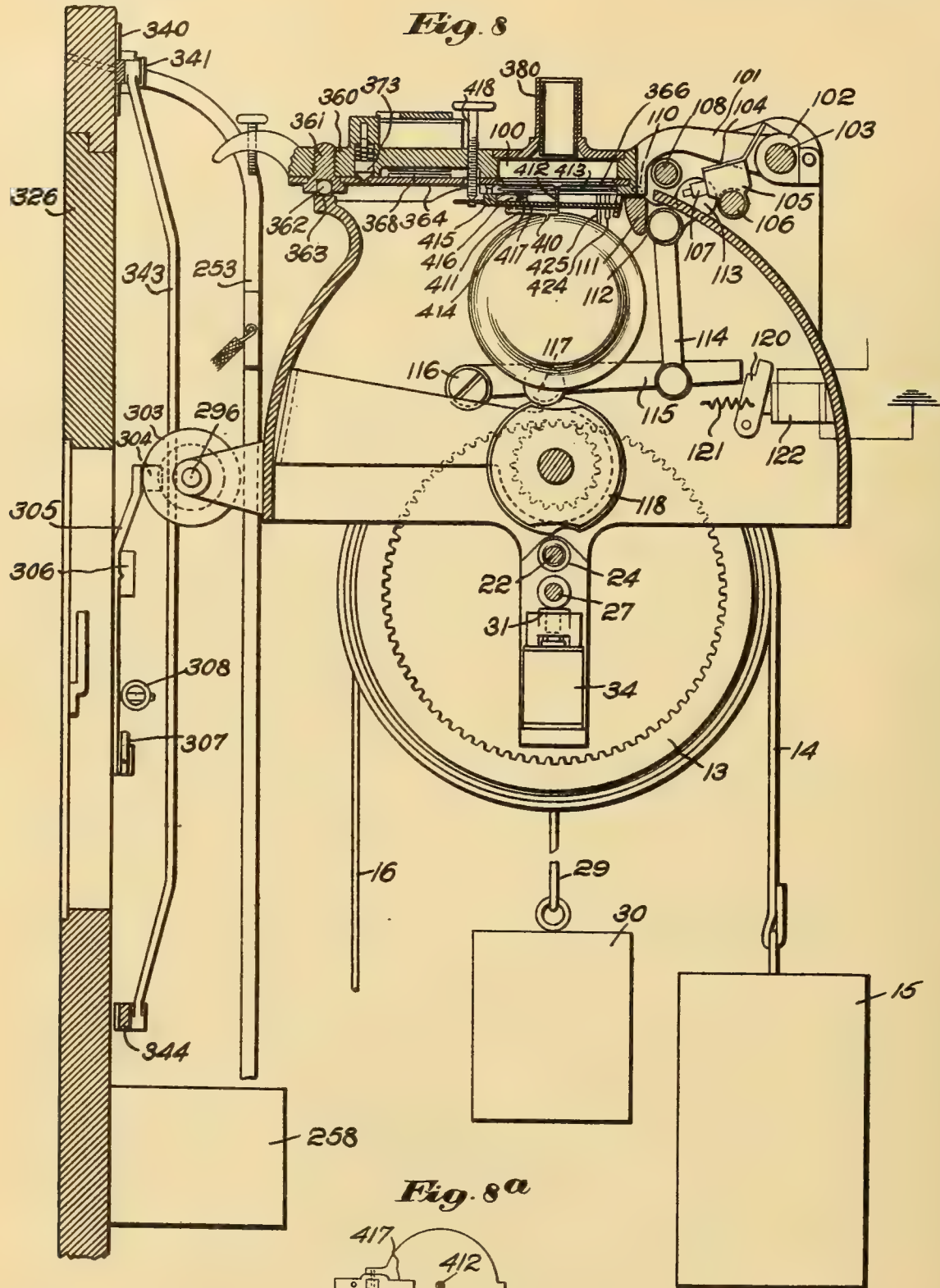
PHONOGRAPH.

APPLICATION FILED APR. 29, 1911.

1,265,009.

Patented May 7, 1918.

9 SHEETS—SHEET 2.



Witnesses:

Robert H. Kammeler.

Carl L. Choate.

Inventor:

George H. Underhill.
by *Curry, Orth, Janning & Tarnay*
Attys.

PHONOGRAPH.

APPLICATION FILED APR. 29, 1911.

1,265,009.

Patented May 7, 1918.

9 SHEETS—SHEET 3.

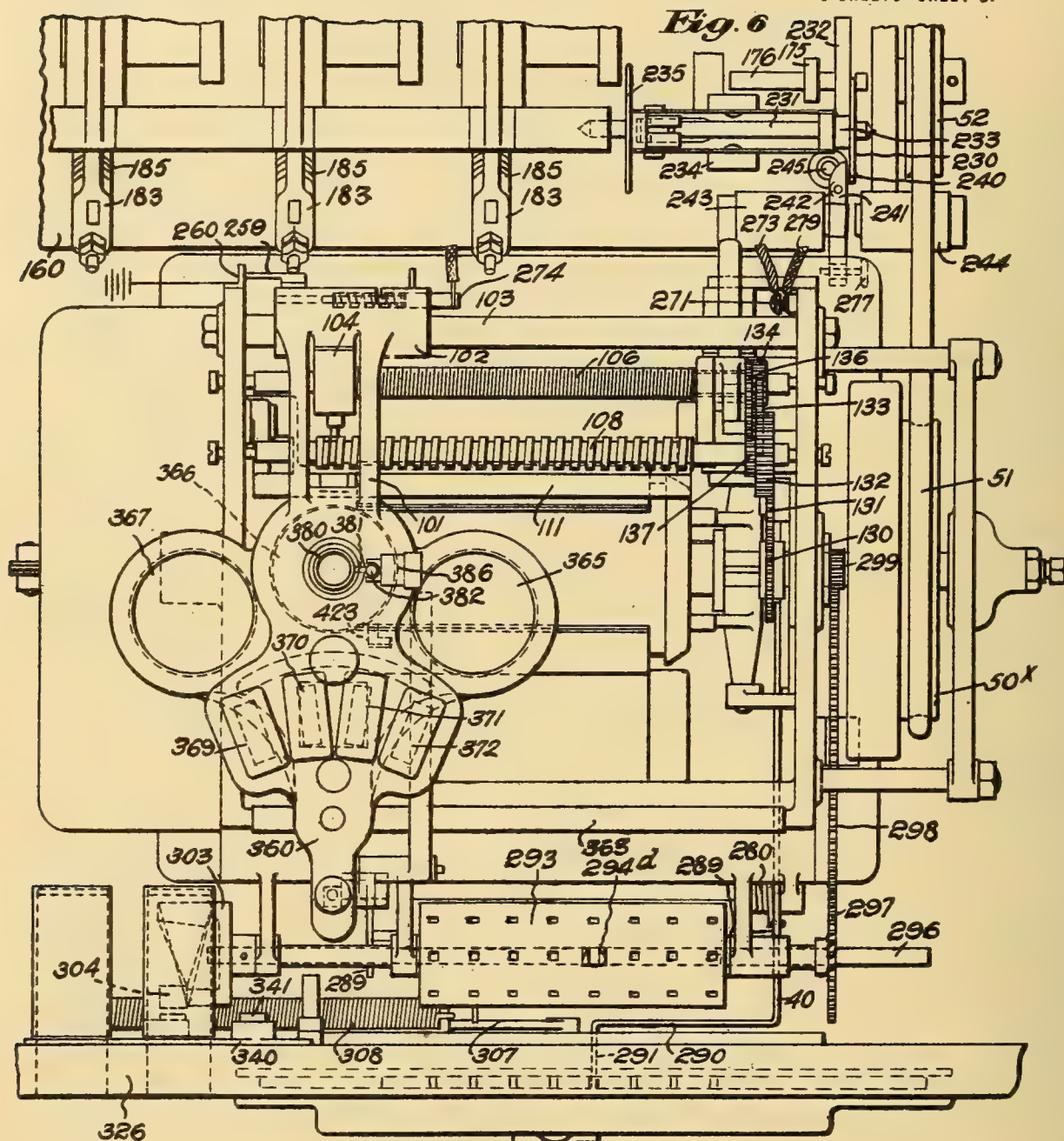
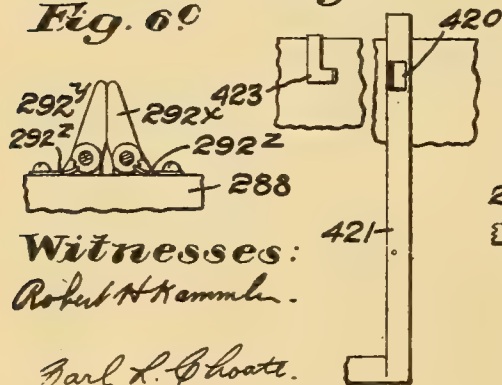


Fig. 60



Witnesses:
Robert H Kemmler.

Carl L. Choate.

Fig. 2

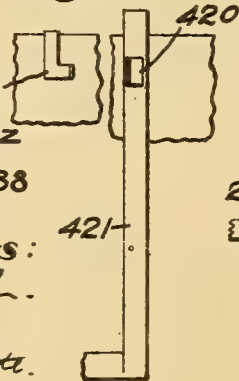


Fig. 6b

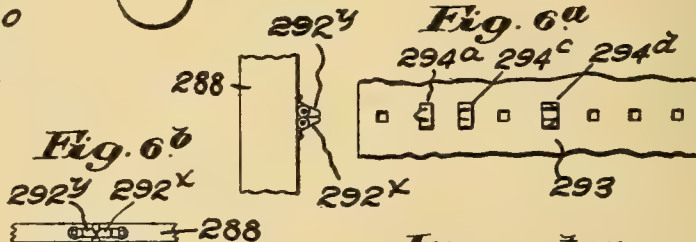


Fig. 6^a

Inventor:

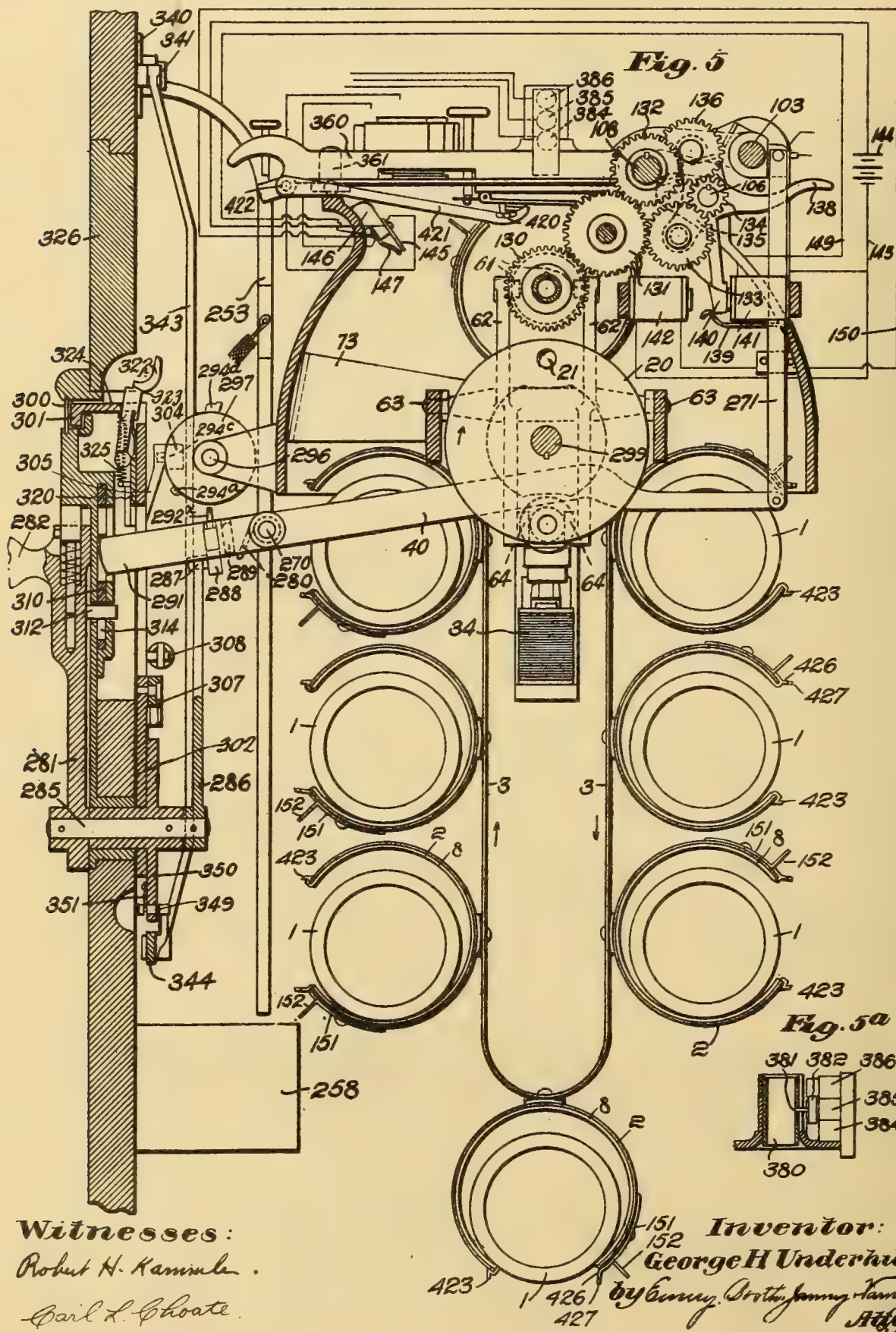
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PHONOGRAPH.

Patented May 7, 1918.

9 SHEETS—SHEET 4.

1,265,009.



1,265,009.

Patented May 7, 1918.
 9 SHEETS—SHEET 5.

Fig. 9

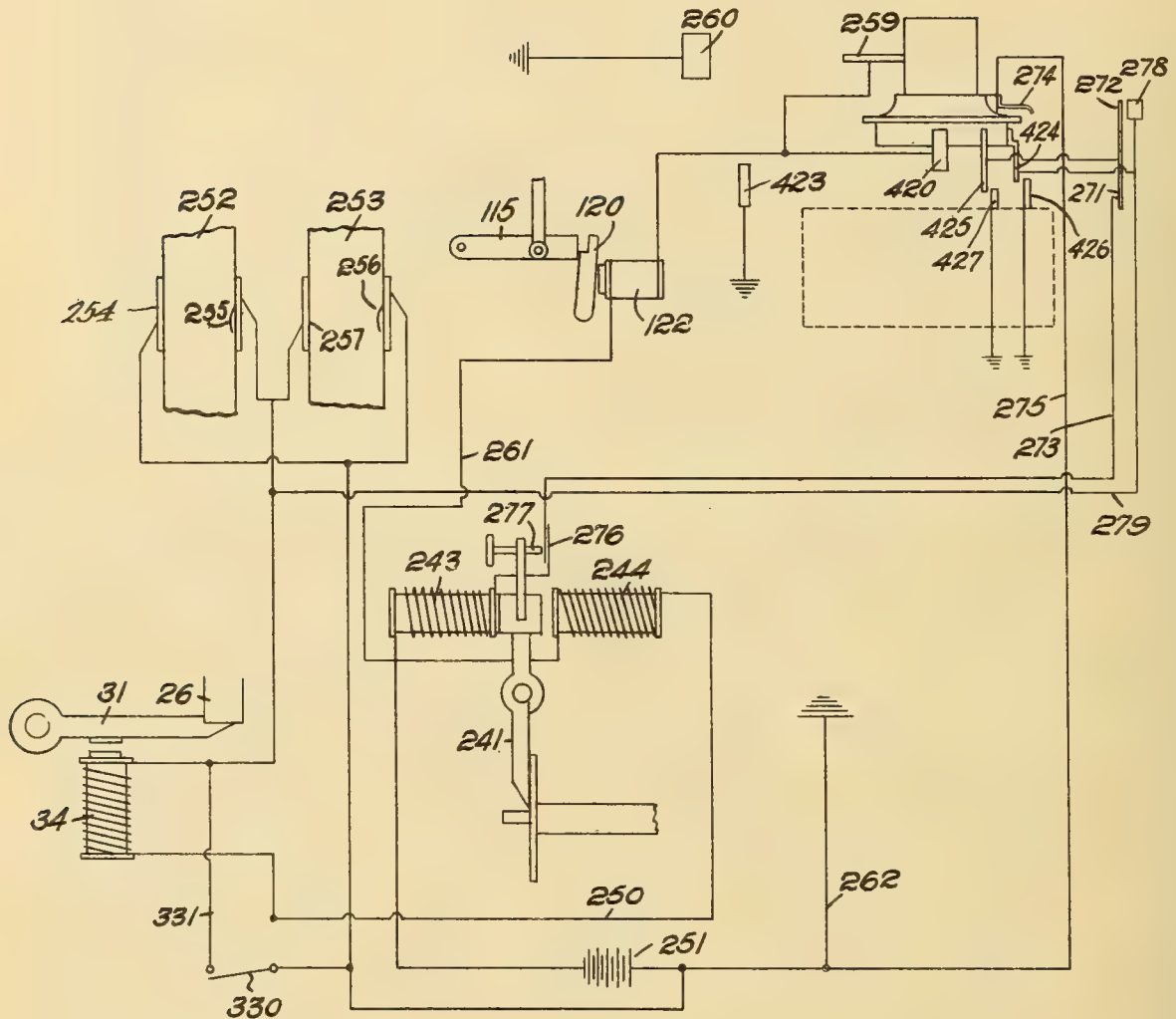
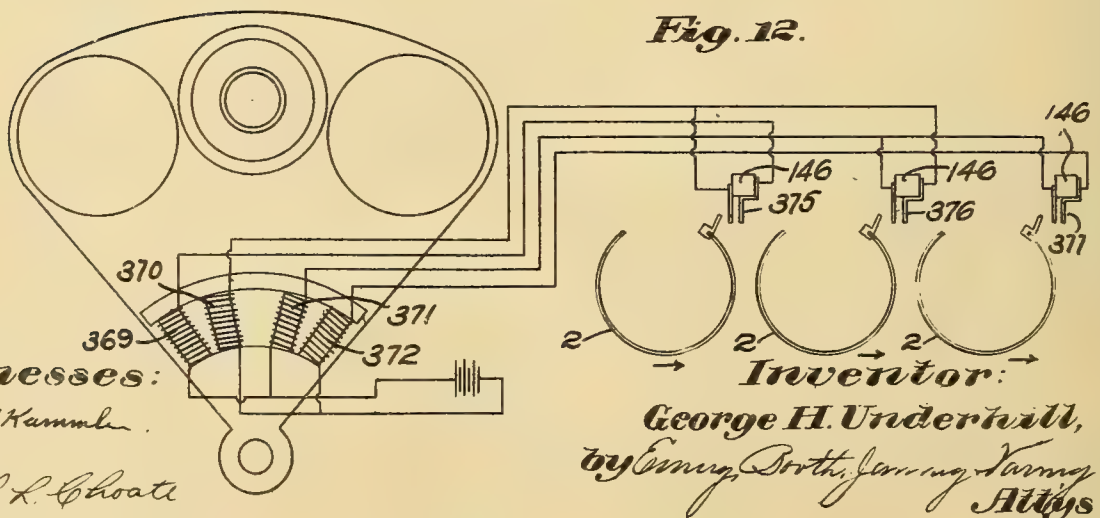


Fig. 12.



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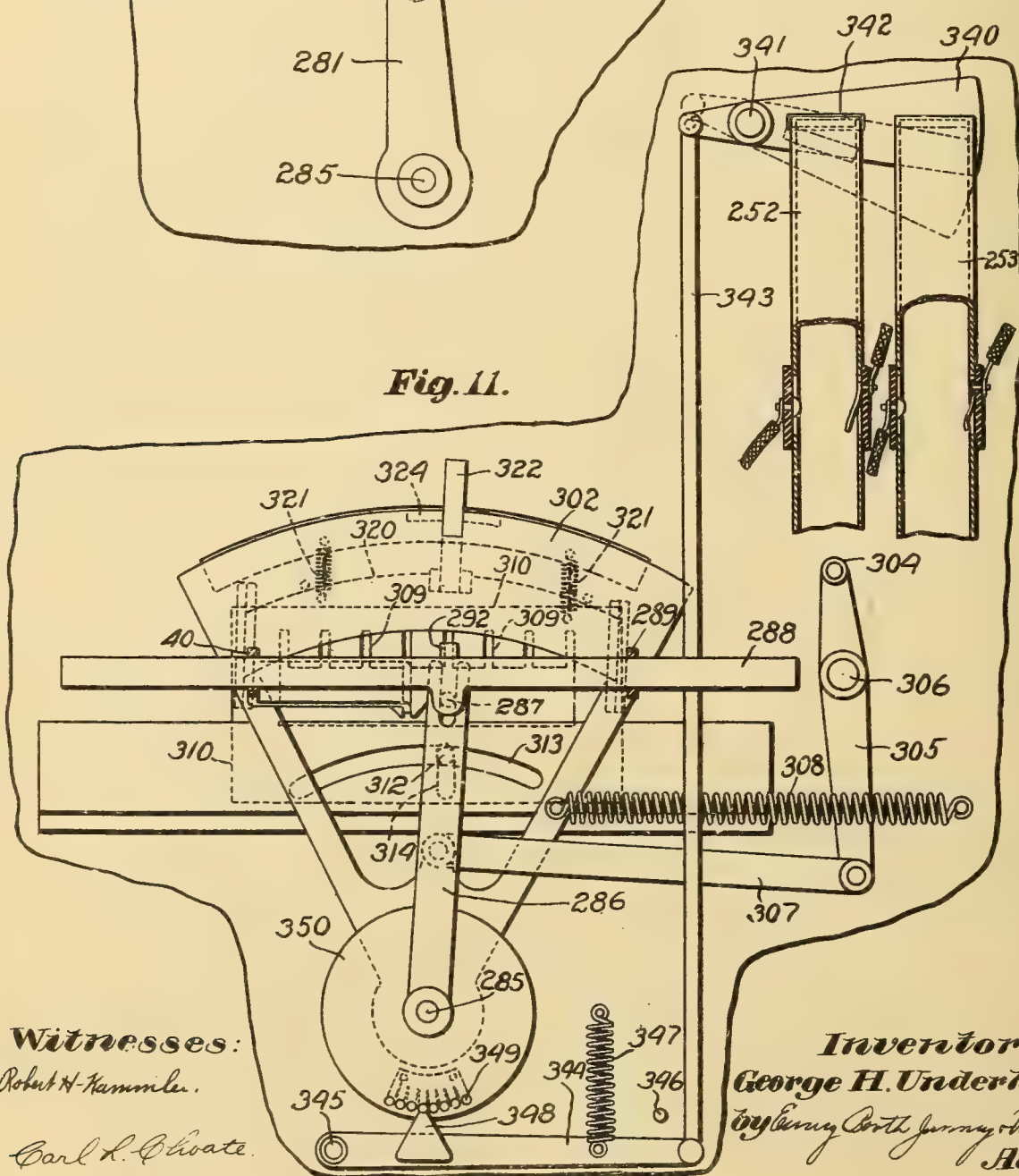
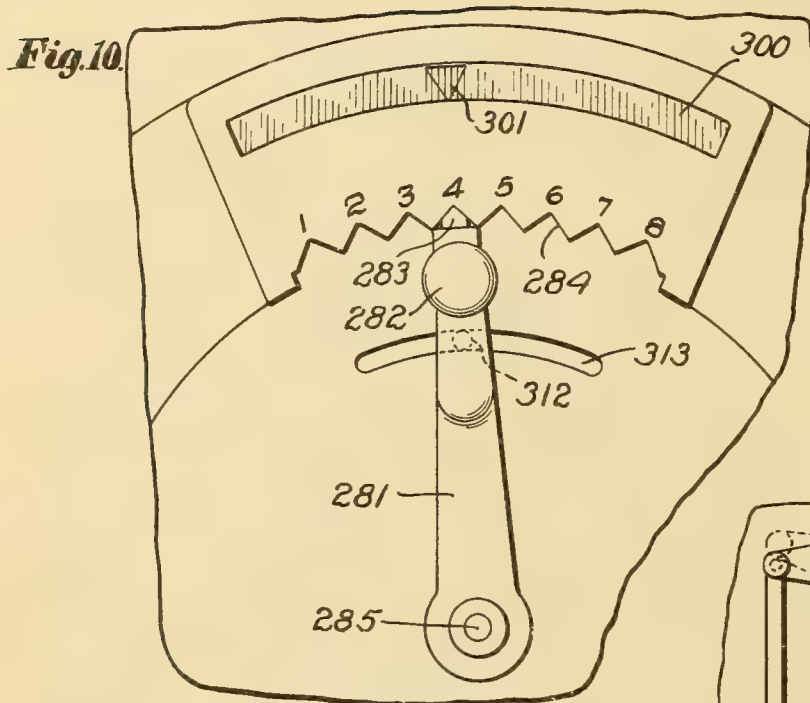
PHONOGRAPH.

APPLICATION FILED APR. 29, 1911.

1,265,009.

Patented May 7, 1918.

9 SHEETS—SHEET 6.



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APPLICATION FILED APR. 29, 1911.

1,265,009.

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9 SHEETS—SHEET 7.

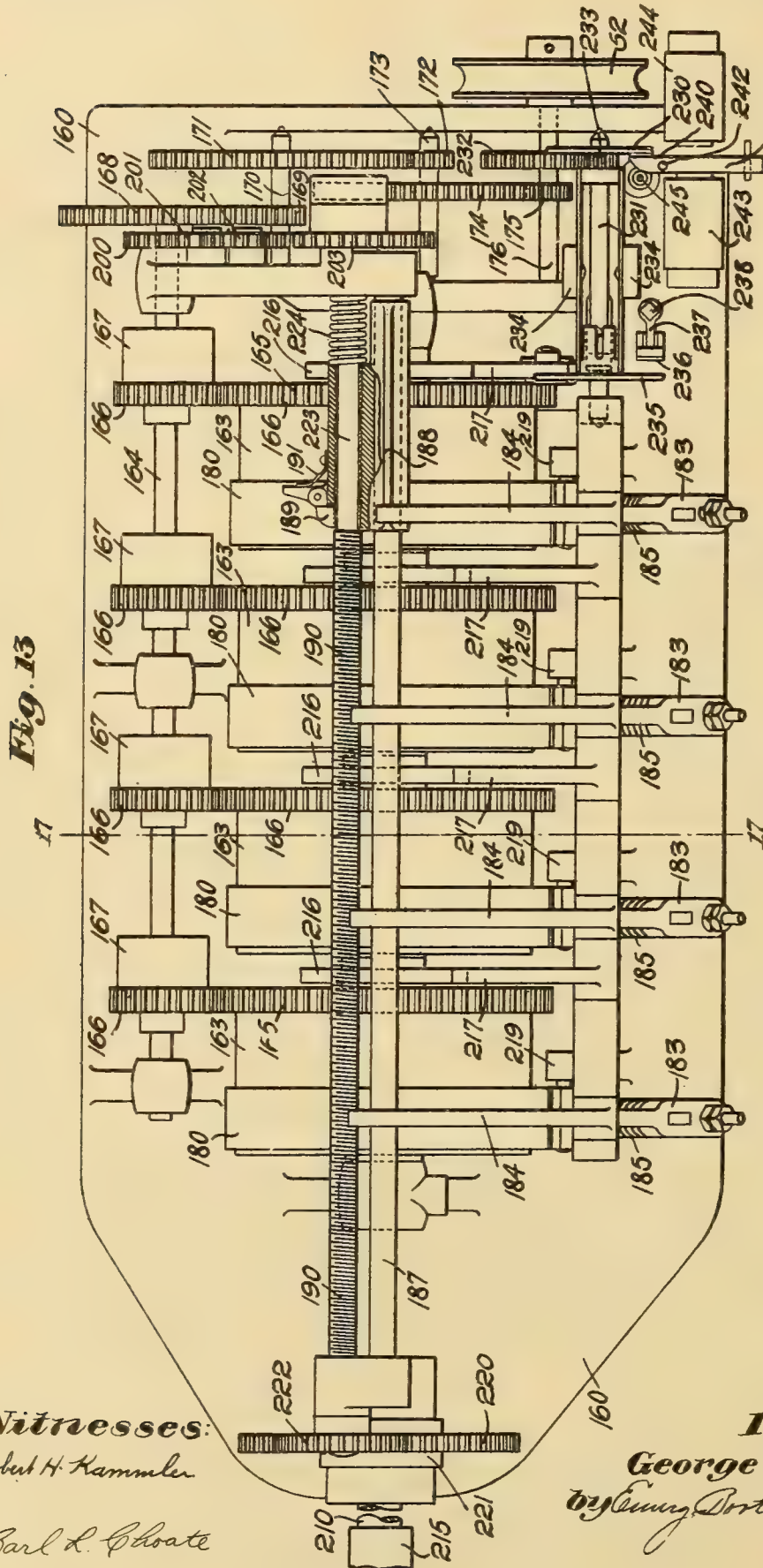


Fig. 13

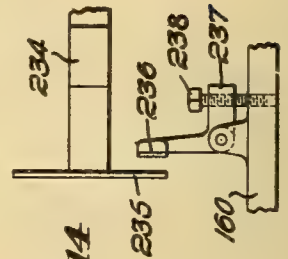


Fig. 14

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1,265,009.

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PHONOGRAPH.
APPLICATION FILED APR. 29. 1911.

Patented May 7, 1918.
9 SHEETS—SHEET 8.

Fig. 15

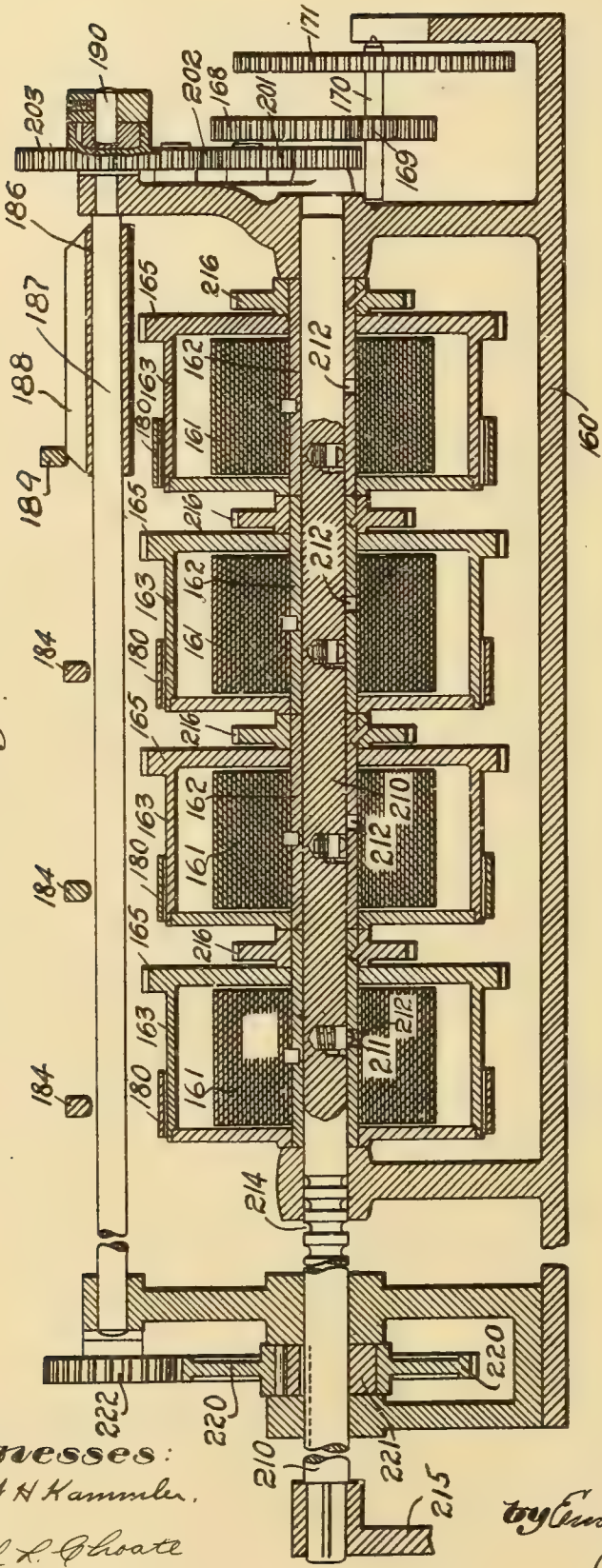


Fig. 15a

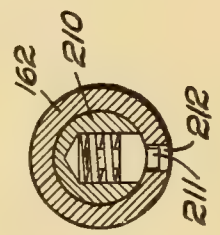
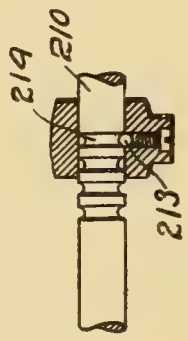


Fig. 16



Witnesses:
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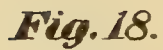
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PHONOGRAPH.

Patented May 7, 1918.

9 SHEETS—SHEET 9.

Fig. 17.



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UNITED STATES PATENT OFFICE.

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PHONOGRAPH.

1,265,009.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed April 29, 1911. Serial No. 624,014.

To all whom it may concern:

Be it known that I, GEORGE H. UNDERHILL, a citizen of the United States, and a resident of Boston, county of Suffolk, State of Massachusetts, (whose post-office address is 36 Gainsboro street, Boston, Mass.,) have invented an Improvement in Phonographs, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention consists in improvements in phonographs. Many of its features have useful application to various different types of such machines including sound recording machines, but my invention in the main is particularly applicable and is herein illustrated with reference to one type of multiple record machine employing a plurality of cylindrical records so held as to be automatically and successively brought into reproducing or recording relation to suitable reproducing or recording mechanism, the latter being caused to automatically traverse the face of each record as the same is presented.

My invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a central sectional elevation of a portion of a sound reproducing machine embodying one form of the invention;

Fig. 2 is a sectional elevation partly broken away showing a record adapter;

Fig. 3 is a view showing the relation of the controlling contacts on the carrier and the frame;

Fig. 4 is an end sectional elevation of a carrier sprocket wheel;

Figs. 4^a, 4^b, 4^c and 4^d show in perspective different forms of pins for the pattern or controlling drum;

Fig. 5 is a transverse sectional elevation of the same machine taken on the line 5—5 in Fig. 1;

Fig. 5^a is a section in elevation through the sound tube.

Fig. 6 is a plan view of the machine shown in Fig. 1 partly broken away;

Fig. 6^a is a development of the section of

the pattern drum showing the pins and their relation to the stop pin for the stop bar;

Figs. 6^b and 6^c show in detail the elevation and plan respectively of the stop member;

Fig. 7 shows the relation of the contacts which control the selection of the sound box diaphragm;

Fig. 8 is an end elevation partly in section taken on the line 8—8 in Fig. 1.

Fig. 8^a is a plan view showing the stylus lever;

Fig. 9 is a diagram of the electric controlling circuit and connections;

Fig. 10 is a front elevation of the designating lever and indicator;

Fig. 11 is a rear elevation of the coin chutes and the parts connected to the designating lever and indicator;

Fig. 12 is a view partly diagrammatic showing the relation of the contacts controlling the shifting of the sound box diaphragm;

Fig. 13 is a plan view of the driving motor employed for the reproducing machine;

Fig. 14 is a detail in elevation showing the governing disk and brake shoe for the motor.

Fig. 15 is a central sectional elevation of the motor;

Fig. 15^a is a section through the winding shaft illustrating the clutch for a spring-winding sleeve;

Fig. 16 is a sectional detail in plan taken through the positioning bar for the motor shaft;

Fig. 17 is an end elevation of the driving motor; and

Fig. 18 is a sectional elevation on the line 17—17 of Fig. 13.

In the drawings for illustrative purposes, the various features of the invention are shown embodied in a multiple record phonograph where a series of record cylinders 1 are held in a flexible carrier and conveyed one by one to reproducing devices, suitable apparatus being provided for designating a certain particular record or records to be played and for causing the automatic playing of such record or records and the subsequent automatic stoppage of the machine when the designated records are played.

While I have illustrated my invention as applied to a machine of this type, it is to be understood that as to many features it

is applicable to single record machines and to machines employing records other than cylindrical records, and to multiple machines of widely different types.

Referring to the drawings, and particularly to Figs. 1 and 5, the records 1 are carried in their holder without the employment of mandrels but each rests loosely in a retainer 2, the latter being preferably in the form of an open-ended tube of greater diameter than the record and having a slot or opening lengthwise the same to permit the engagement of the sound reproducing mechanism with the record while still contained within the retainer. Each retainer may be constructed of steel tubing sawed to proper lengths and cut away to provide the slot or it may be stamped or bent out of sheet metal.

The retainers are assembled in the form of a flexible carrier in any suitable way, as by being riveted or otherwise secured, at opposite ends to a flexible band or tape 3, the two tapes passing over sprocket wheels 4, the latter keyed to the carrier driving shaft 5. The sprocket wheels (see Fig. 4) are provided each with four teeth 6 which register with suitably arranged perforations 7 so located that rotation of the shaft brings the record retainers successively in position vertically above the sprockets and in appropriate relation to sound reproducing mechanism.

Each retainer is preferably lined with strips 8 of felt which prevent injury to the records during the travel of the carrier, and the dimensions of the retainers and the slot therein are such that in all positions of the retainers the records are carried thereby without injury and without excessive displacement as the carrier changes position while leaving the record sufficiently free or loose therein for purposes subsequently to be described.

Means are provided to impart a constant turning effort to the carrier driving shaft but the latter is normally locked against turning movement and is released through the operation of appropriate controlling devices when it is desired to shift to the next successive or to another record. To turn the shaft, the latter is provided at the end with a driving pinion 10 which has a roller clutch connection 11 to the shaft and is driven by the internal gear 12 on the pulley 13. The latter has wound thereon the band 14 connected (Fig. 8) to the weight 15, the latter tending constantly to turn the pulley and therefore the driving shaft and gears in the direction indicated by the arrow in Fig. 5. The pulley 13 has a second grooved portion on which is wound the winding cord 16 wound reversely to the band 14 so that as the weight drops the cord winds on. The cord passes to some convenient point

(not shown) exterior to the case of a machine so that it can be pulled out and the weight wound up from time to time as may be required. The roller clutch connection 11 between the pinion 10 and the shaft 5, permits this winding movement without movement of the shaft or carrier. While a winding cord is herein shown for the purpose of winding up the weight, obviously any suitable means may be employed for that purpose or for maintaining a constant turning effort on the sprocket shaft.

Referring now to the carrier locking and releasing mechanism, the carrier shaft 5 has fixed at its opposite end a locking disk 20 provided with two diametrically opposite perforations 21. When a record retainer has been brought by the sprocket into correct position for playing the record, one of these perforations is brought into registration with a sliding locking bolt 22 and, if not prevented by devices to be later described, the locking bolt will enter such perforation and hold the disk, and therefore the sprockets and carrier, in fixed position. The locking bolt also slides through an adjacent portion of the machine frame 23 so as to hold the disk rigidly against movement.

The locking bolt is normally forced toward the locking disk by means of a spiral spring 24 interposed between the frame 23 and a collar 25 pinned to the bolt.

To release the carrier the locking bolt is moved back and the spring 24 compressed by means of a sliding actuator sleeve 26 which slides on the bolt and abuts against the collar 25, such actuator being constantly drawn toward an unlocking position (to the left in Fig. 1) by means of a slide rod 27, the latter fastened to the cord 28 passing over the pulley 29 and secured to the weight 30 (Fig. 8).

The movements provided for locking and unlocking the carrier are as follows: When the carrier is locked the actuator 26 is normally held in an inoperative position by means of the latch 31 pivoted on the frame, which latch is constantly pressed into engagement with the edge of the actuator sleeve by means of the spring 32. The latch carries an armature 33 operatively disposed with relation to the carrier releasing magnet 34, the latter energized through electrical connections to be later described. At the appropriate time the magnet 34 is energized, attracting the armature and releasing the actuator which is drawn to the left by means of the weight 30. This withdraws the locking bolt from the locking disk and releases the carrier to permit advancing movement thereof, which immediately takes place. The actuator, in moving to the left, brings a cam roll 35, carried thereby, into operative relation to an edge cam 36 car-

ried by the adjacent sprocket wheel 4. As the sprocket turns to move the carrier, its edge cam engages the actuator and forces the latter back leaving it finally in a position where the latch slips over its edge and prevents subsequent return movement irrespective of further movement of the sprocket until the carrier releasing magnet is again energized.

As the actuator is moved back to inoperative position, the spring 24 causes the locking bolt collar 25 to follow it up until the end of the locking bolt meets the face of the locking disk or the face of a main controlling lever 40 (Figs. 1 and 5) which is adapted to oscillate across the face of the disk and in the path of the locking bolt. The complete function of this lever will be referred to later. If the controlling lever 40 is raised, as shown in Fig. 1, leaving the locking bolt free to enter the perforation 21 of the locking disk, as soon as the carrier turns sufficiently to bring such perforation within the path of the bolt, the latter will enter the same and stop further movement of the carrier. If the controlling lever, however, has been depressed to cover one of the perforations of the locking disk the locking bolt will be prevented from entering the same and the carrier will continue to turn until the controlling lever has been raised to permit the locking bolt to enter the next perforation crossing its path.

Referring now to the devices for engaging the record which is to be played and for rotating it in operative relation to the sound reproducing mechanism, there are provided means, herein a pair of grooved disks, which engage directly with the end walls of the record shell and rotate the same, the record being freed from its retainer to permit such rotation either by depressing the carrier or by lifting the record through the action of the rotating devices or other means, or preferably by the combined depression of the carrier and lifting of the record.

Referring to Fig. 1, there are shown two record engaging devices comprising the rotatable disk 42 having an annular groove 43 adapted to receive one end of the record shell and the opposite companion disk 44 having the annular groove 45 adapted to engage the opposite end of the record shell. The disk 42 is secured to a short shaft 46 adapted to turn freely in the ball bearings 47, there being herein no provision for axial movement of the said disk. The disk 44, however, is mounted to slide axially upon a tubular shaft 48 the latter mounted to turn in ball bearings 49 and 50. The disk 44 acts as the driving member for the record being keyed to the shaft 48 which in turn is driven by the driving pulley 50^x connected by means of the spring belt 51 (Fig. 6) to the driving pulley 52 of any suitable motive

device. Preferably there is also provided a fly wheel 53 herein forming a part of the pulley 50^x so as to steady the speed of the record rotating mechanism.

When a record is positioned by the carrier for playing, the driving disk 44 is moved to engage the same and force the opposite end of the record into its seat upon the opposite disk 42, the record then being held clamped between the two disks which are driven at the required rate of speed through the driving mechanism described. After the record has been played, the driving disk 44 is moved back to release the record and restore it to the carrier, the record in sliding off from the beveled edges of the fixedly positioned disk 42 being given a sufficient lateral movement to clear the said disk.

To impart the appropriate record engaging and disengaging movements to the disk 44, the latter is provided with a grooved portion 60, which is engaged by the pins 61 (see Fig. 5) carried by the forked lever 62 pivoted at 63 upon the frame, the opposite or lower arms of the lever carrying lugs 64 which contact with the shoulder 65 (Fig. 1) of a sleeve 66 pinned to the locking bar 22.

The disk 44 being slidable upon the tubular shaft 48 the locking bar 22, acting through the lever 62, moves the disk back out of the path of, or engagement with, the record shells during all such times as the locking bolt is held back from entrance into one of the locking disk perforations 21.

When, however, the locking bolt is permitted to enter such perforation, which occurs only when the record carrier has positioned a record shell in substantial alinement with the end engaging devices, movement of the locking bolt into its locking position throws the lever 62 about its pivot, releases the driving disk and permits a coiled spring 67 contained within the tubular shaft to throw the driving disk to the left and grip or engage the adjacent end of the record shell.

When the carrier is unlocked by any unlocking movement of the bolt 22, this acts through the lever 62 to throw the disk 44 to the right, releasing the record and restoring it to the carrier.

Herein the record is free for rotation from the carrier, both by withdrawing the carrier itself and slightly lifting the record. A sufficient lifting of the record is had by the inclined shape of the edges of the end engaging disk which wedge the record shell slightly upward. Simultaneously with the slight lift which is given the record by the means described, freeing of the record is further insured by movement of the carrier in an opposite direction through depressing devices as follows: Referring to Fig. 4, it will be seen that the sprockets 4 are not perfect cylinders but have diametrically oppo-

site depressions 70, one of which comes beneath the record retainer when playing position is reached by the carrier. The movement of the carrier locking devices which
 5 cause engagement of the record by the record rotating means, also simultaneously releases gripping devices which move in and grip the flexible carrier and press the same into the depressions 70 upon the sprockets
 10 so that that portion of the carrier immediately below the record is depressed into the position represented in Fig. 4, thereby insuring rotation of the record free from any contact with the carrier.

15 Referring to Fig. 1, the gripping devices comprise sleeve members 71 slidably mounted one upon each hub of the sprocket wheel and provided each with a suitably formed lip 72 which, when the gripper is moved in
 20 toward the sprocket wheel, is adapted to overlie and engage the edge of the carrier and wedge and depress the same into the underlying depression 70 of the sprocket. These grippers are secured to or carried by
 25 spring members 73, the opposite ends of which are fixed to the frame and so arranged that they continually press the grippers in toward the sprockets with sufficient force to depress the carrier when the latter
 30 is engaged thereby.

The grippers are held back or away from the sprocket except when the latter is locked in fixed playing position but are released at the appropriate time by devices controlled by the locking bolt.
 35

To open the grippers simultaneously with the unlocking of the carrier, the locking bolt 22 carries a pin 74 which, when the bolt is released by the latch 31, strikes
 40 against a disk 75 carried by a sleeve 76 slidably mounted on the carrier driving shaft. The sleeve 76 has a link connection to a second sleeve 77 and also to a lever 78 pivoted on the shaft which, in turn, has a
 45 link connection to a third sleeve 79. The connections are such that when the locking bolt moves to the left (Fig. 1), it carries the sleeve 76 with it, moving both sleeves 77 and 79 outwardly or in opposite directions. The sleeve 77 is provided with pins
 50 80 and the sleeve 79 with pins 81, each set of which slide through perforations in the adjacent sprocket wheel and are adapted to force and hold the grippers 71 away from
 55 the sprocket and out of engagement and out of the path of the carrier. So long as the locking bolt is held in an unlocking position, it holds the grippers out of the way of the carrier. As soon, however, as it moves
 60 to its locking position, it releases the grippers and they move into a position to grip and lock the carrier and the sprockets.

While herein providing for a movement both of the carrier and the record to insure
 65 the freeing of the latter from the carrier as

previously stated, either movement might be solely relied upon to free the same.

To provide for the automatic travel and return of the reproducing mechanism, provision is made for lifting the sound box and
 70 the stylus free from the record simultaneously with the unlocking of the carrier and the initiation of its shifting movement, the sound box being then returned to its initial position and the stylus allowed to engage
 75 with the new record as soon as the latter has been brought into playing position.

The sound box 100 is carried by the arm 101 to overhang the record which is in playing position, the arm 101 being carried by
 80 the sleeve 102, the latter slidably mounted upon the guide bar 103. The sleeve 102 carries an arm 104 (Fig. 8) provided with the nut 105 which when the sound box is depressed, engages with the feed screw 106.
 85 This causes the advance of the sound box at a relatively slow speed during the playing of the record.

The arm 104 also carries a second nut or other member 107 suitable for engaging with
 90 the coarse threaded return screw 108 when the reproducer arm is lifted, such lifting movement serving to disengage the nut 105 from the feed screw 106.

To lift the reproducer arm the latter is
 95 provided with a ball support 110 mounted to travel along a rail 111, which rail is carried by arms 112 fulcrumed at 113 on the machine frame. One of the arms is connected to a link 114, the latter joined to
 100 the lever 115 pivoted at 116 to the frame. The lever 116 carries a cam roll 117 which rests against the edge of a cam 118 keyed to the carrier driving shaft 5. The cam 118 (Fig. 8) is provided with two diametrically
 105 opposite depressions so positioned that when the carrier has brought a record to operative position the cam roll will register with one of the said depressions and, except when prevented by devices to be referred to, will
 110 allow the lever 115 to descend dropping the rail 111 and bringing the stylus against the record to engage with the groove thereof. In all other positions of the carrier, however, the cam 118 holds the lever 115 up so
 115 as to raise the reproducer and hold the stylus away from the record.

The moment that the carrier is unlocked and commences to move, the cam lifts the cam roll and lever and therefore the rail 111 and
 120 the stylus and initiates the return movement by causing engagement between the return screw 108 and the nut member 107. It will, therefore, be seen that the unlocking of the carrier not only releases the record and
 125 starts the shifting movement of the carrier, but also raises the reproducer and starts its return movement. Furthermore, when the carrier has brought the selected record into playing position, it is automatically locked
 130

and the sound box automatically lowered to bring the stylus into engagement with the record, the record being simultaneously seized by the rotating devices, whereupon its reproduction immediately commences, and continues until the record is played.

In order to prevent the stylus from being lowered into engagement with the record before it has been restored to its initial position, a latch 120 (Fig. 8) is preferably provided normally held in engagement with the end of the lever 115 by means of a spring 121 so as to prevent the lowering of the lever and of the stylus except when such latch is retracted by means of the magnet 122. Provision is made, as will hereinafter appear, whereby the magnet 122 is only energized when the sound box is at its initial position and the selected record is in place which it is intended to play.

Referring now to the driving mechanism for the feed and return screws, the latter is driven at a relatively high rate of speed from the tubular record driving shaft 48 by means of the gear 130 fixed on the said shaft and meshing with the intermediate gear 131, the latter driving the broad faced gear 132 upon the return screw 108.

The feed screw 106 may be driven at any one of a plurality of speeds to suit different speed requirements for different records. That is to say, certain records may be required to be played in two minutes and for these the stylus can be traversed at a relatively high rate of speed; other records of the same cylinder length may be required to be played in three, four or five minutes, and for these the stylus can be traversed at a relatively low rate of speed.

As illustrative of such speed change mechanism for the feed screw, I have herein shown speed change gears as follows: For the rapid rate of stylus travel, the gear 132 is caused to mesh with an intermediate gear 133 and the latter meshes directly with the feed gear 134 fixed upon the feed screw 106. The intermediate gear 133, however, is journaled upon a swinging frame or bracket 135 pivoted upon the feed screw 106 and upon another arm of such bracket is journaled a second intermediate gear 136 also meshing with the feed gear 134 but adapted to be thrown into engagement with a gear 137 keyed to the return screw 108 and of smaller diameter than the gear 132. The bracket 135 may be swung to a position to engage the gears 136 and 137 for the slow speed of the feed screw, or to a position to engage the gears 132 and 133 for the high speed of the feed screw.

To change from one speed to the other, the bracket is provided with a projecting finger piece 138 by which it may be moved to either position, a spring 139 engaging a finger 140 depending from the bracket and

serving to hold the bracket in either position in which it is placed. In addition to this manual means for adjusting the speed, the speed may be changed automatically and, if desired, with reference to the peculiar requirements of the record in any given case. For changing the speed automatically to suit the speed requirements of the different records, the finger 140 carries an armature operatively related to the two electro-magnets 141 and 142, by the energization of the appropriate one of which the speed change gear may be shifted.

The controlling circuits for these magnets are shown semi-diagrammatically in Figs. 3 and 5. The two magnets have a common battery circuit 143 connected to the battery or other suitable source of electro-motive force 144. The battery wire 143 leads from the battery (see Fig. 5) to a broad contact piece 145 located on the upper side of an insulated rail 146 (see Fig. 5), the latter carried by a fixed part of the frame and adjacent to the path of travel of the record retainers. Underlying the battery contact 145 are two contacts 147 and 148 connected respectively through the wires 149 and 150 with the magnets 141 and 142.

Each record retainer (see Figs. 3 and 5) is provided with a pivoted adjustable clip 151 having a projecting end 152 which, just before the record retainer reaches playing position, is adapted to strike one or the other of the two magnet contacts 147 and 148 according to the position to which the clip has been adjusted about its pivot and cause it to touch the battery contact 145. If it is adjusted to engage with the magnet contact 147, the magnet 141 will be energized and a slow feed for the stylus insured. If the contact 148 is closed the higher rate of stylus travel will result.

By variously adjusting the stylus controlling clips 151 on successive record retainers to conform to the speed requirements of the individual records contained therein, the speed change gears will be so positioned as to provide for a rate of travel of stylus appropriate for the particular record then coming into playing position.

While I have herein shown a speed change mechanism designed to provide either one of two speeds for the travel of the stylus, it is obvious that additional speed changes might be employed where conditions arise to render it desirable, and that additional speed changes might be automatically had by means similar to those herein described.

Referring now to the motive means for driving the record rotating devices, I have provided an improved form of motor comprising a plurality of individual units adapted to be brought successively into operative relation to the driving mechanism,

In the described embodiment of the invention such motor is a spring motor wherein a plurality of spring-actuated devices are so employed as to permit each spring unit to
 5 be utilized under conditions of greatest efficiency and permitting, furthermore, the construction of a spring motor of great capacity within a comparatively small compass.

Referring to the drawings and particularly to Figs. 13 to 18, inclusive, the motor is mounted upon a base 160 and comprises a series of flat coiled springs 161, herein four in number, connected each at its inner end to a tubular winding sleeve 162 and at its opposite end to a drum 163. Any one of the four drums when released for unwinding drives a countershaft 164 through the drum-attached gear 165 which meshes with the gear 166, the latter connected to drive the countershaft 164 through the roller clutch device 167 (Fig. 18). The latter imparts driving movement from the associated gear 166 to the countershaft, but permits the countershaft to be turned from another spring drum
 25 163 without affecting the position of the first-mentioned gear 166.

To impart driving movement from the countershaft 164 to the driving pulley 52, the former carries at its end the driving
 30 gear 168 meshing with the pinion 169 on the intermediate shaft 170. The latter carries the large gear 171 meshing with the pinion 172 on the second intermediate shaft 173, which latter carries the large gear 174. The gear 174 in turn meshes with the small pinion 175 mounted on the shaft 176 which carries the driving pulley 52. By these means a turning movement of the countershaft 164 is transmitted to the pulley 52 at
 40 greatly increased speed ratio.

Referring now to the devices for bringing into operation successive motor units, each drum is normally held from rotation by means of a brake band 180, such band being
 45 fixed at 181 and connected at 182 to an arm 183 of the brake releasing lever 184. A spring 185 normally holds the brake applied, but it may be released to drive the record rotating shaft by the sliding, releasing sleeve 186. The latter is mounted to slide along a fixed guide rod 187 and has a rib or fin 188 (see Fig. 15) which passes beneath the levers 184 in succession and lifts them one after another to release the attached brake and apply the spring for driving the motor. The releasing sleeve carries a nut member 189 (Fig. 13) pivoted on the sleeve so that it can be thrown into or out of engagement with the feed screw 190, the
 60 nut member being normally pressed into engagement with the screw by the spring 191.

During the operation of the machine the feed screw 190 is turned by the countershaft 164 at a speed and in a direction suitable
 65 for feeding the releasing sleeve from right

to left as viewed in Fig. 13 through gearing shown in Figs. 13 and 17. Fast upon the countershaft is a gear 200 meshing with an intermediate gear 201 and the latter with a second intermediate gear 202. The gear 202
 70 drives the gear 203 fast upon the feed screw 190.

Provision is made for winding up the successive spring units as follows: Each spring winding sleeve 162 is adapted to be
 75 separately connected to the spring winding shaft 210 by means of spring-pressed detents 211 (Fig. 15) carried by said shaft and adapted to be brought one by one into a position to snap into openings 212 arranged
 80 one in each of the spring winding sleeves. The head of the detent is rounded lengthwise the sleeve, but has a straight face circumferentially the sleeve (see Fig. 15^a) so that, while the shaft can be slid axially so
 85 as to bring the detents successively into engagement with their respective sleeves, it locks the shaft to the sleeve for rotative purposes.

The shaft, when slid from one position
 90 to another, is definitely positioned by means of a spring-pressed ball 213 (Fig. 16) which snaps into one of a series of grooves 214 formed in the periphery of the shaft 210. At the end of the shaft exterior to the casing
 95 there is fixed thereon a suitable handle, a portion of which is shown at 215 (Fig. 15) whereby the motor may be wound up at will from time to time. In winding the motor the shaft is first brought into rotative
 100 engagement with the first spring of the series and such spring wound up tightly. It is then brought into engagement with a second spring and so on until all springs have been tightly wound up. The unwinding
 105 movement of each drum is prevented by means of a ratchet 216 secured thereto, such ratchet being engaged by a spring-pressed pawl 217 pivoted coaxially with the releasing lever 184, the end ratchet (right hand
 110 in Fig. 13) of the series having a locking pawl 218 pivoted on a lug 219 on the bed plate.

When the winding shaft 210 is turned to wind up the springs the feed screw is re-
 115 versely turned to move the releasing sleeve back to its initial position. This movement is secured by providing a gear 220 connected to be turned by the winding shaft through a roll clutch member 221, the gear meshing
 120 with a smaller gear 222 on the end of the feed screw 190. This transmits reverse movement to the feed screw when the winding shaft is turned in a direction to wind up the springs but does not turn the feed
 125 screw if the shaft is turned in the opposite direction, nor does the opposite or feeding rotation of the feed screw tend to turn the winding shaft by reason of the interposed roll clutch device.

The initial end of the feed screw is provided with an unthreaded portion 223 so that when the releasing sleeve reaches the same further retrograde movement ceases.

5 A spring 224 is interposed between the sleeve and the frame to press the nut member 189 initially against the threaded portion of the screw so that the moment the feeding movement of the screw begins the
10 release sleeve also begins its movement.

Preferably the parts are so adjusted that the releasing member is returned to its initial position before the last spring has been completely wound up and preferably it completes its traverse beneath the releasing lever
15 of each spring unit before its spring is completely unwound. This provides for working each spring unit between a limit of maximum compression and a lower limit
20 which may also represent relatively high compression as compared with the complete unwinding of the spring. The utilization of these successive spring units each working between limits which provide for maximum efficiency supplies a very effective
25 spring motor in that the records all tend to be driven under an impelling force having very slight variations. It also provides a motor having great capacity within small
30 limits of space.

To stop, start, and control the application of power from the motor to the record rotating mechanism there is provided a brake or stop disk 230 (Figs. 6, 13 and 17) secured
35 to the brake shaft 231 and driven from the motor driving shaft 176 by means of the intermeshing gears 232 and 233. The brake shaft is provided with a weight governor having the weights 234 which control the
40 position of the governing disk 235, the latter adapted to move against the fixed brake shoe 236 if the speed exceeds a predetermined limit, thereby slowing down the motor. The brake shoe 236 is mounted upon
45 a bell crank lever 237 and may be adjusted by means of the adjusting screw 238 to adjust the speed limit.

The motor is started and stopped by engagement with the brake disk 230 by the
50 brake shoe 240 carried by the stop lever 241, which latter is pivoted at 242. The stop lever carries an armature operatively related to the stop magnet 243 and the releasing magnet 244, so that when the former is energized the brake is applied and the motor
55 stopped, and when the latter is energized the motor is free to drive the machine. A spring-pressed bevel-ended detent pin 245 is pressed upward into the path of the lever
60 241 to engage one side or the other thereof according to the position of the lever, so that the brake is held in its on or off position irrespective of the continued energization of the magnet and until again thrown to its
65 opposite position.

The machine is started, stopped, the carrier shifted and any one or more selected records automatically played through the electrical control of the releasing magnet
34 and the brake magnets 243 and 244.

Referring to Fig. 9, there is there shown a diagrammatic arrangement of electrical connections. The carrier releasing magnet 34 and the brake releasing magnet 244 are contained in a main starting circuit 250
70 which also includes the battery 251 or other suitable source of electro-motive force and suitable starting contacts. The circuit is herein closed to start the machine through the battery and the magnets 34 and 244 by
75 the insertion of a coin in either of the coin chutes 252 or 253 (see also Figs. 5 and 11), the first intended for coins for a smaller denomination, such as one cent, and the latter for coins of larger denomination, such
80 as five cents. The purpose of these chutes will be more fully referred to. A coin dropped into the chute 252 bridges the contacts 254 and 255 (see Fig. 9) and a coin dropped into the chute 253 bridges the con-
85 tacts 256 and 257. The coin passes downward to the coin box 258 (Fig. 5) but closes the circuit 250 for an interval long enough to energize the magnet 34 to release the carrier and energize the magnet 244 to start
90 the motor turning. The two sets of contacts in the two coin chutes are connected in multiple so that a coin in either chute starts the machine.

The carrier when released will continue to
100 turn as previously stated until the selector lever 40 is caused to lift and uncover a locking opening in the locking disk 20. The reproducer being lifted on the initial movement of the carrier as previously described
105 and being returned to its initial position by the feed screw will be lowered automatically at that point by the energization of the lowering magnet 122. To energize the latter magnet, the sound box supporting
110 sleeve 102 carries the contact 259 adapted to touch the fixed contact 260 on the frame of the machine when the stylus has reached the beginning of the sound groove in the record. The contact 259 is connected by a
115 flexible conductor to the magnet 122, and the latter through the wire 261 to the battery 251, the latter in turn being connected through the wire 262 to a ground on the frame of the machine. The stylus being
120 thus automatically lowered, when it reaches its initial position, the reproduction of the record immediately begins.

The movement of the carrier is effected quickly as compared with the return movement of the sound box, so that preferably the selected record will be in position before the sound box reaches its initial position, even though the carrier has to be turned
125 through substantially its entire length.

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When the reproduction is finished and the sound box reaches the opposite end of the record, the machine may be either stopped by energizing the brake applying magnet 243 or the carrier may be released for a continuation of the reproduction either of the next successive record or some other selected record according to the position of the selector lever 40. The lever 40 which is fulcrumed at 270 on the machine frame (see Fig. 5) is jointed at one end to the upright slide rod 271, the latter carrying near its upper end the contact 272 which is connected through the conductor 273 to the brake applying magnet 243. The sound box carrying sleeve 102 (Fig. 6) is provided with the contact 274 adapted to touch the contact 272 when the sound box has reached the end of the record provided the selector lever is elevated. The contact 274 is connected through the flexible conductor 275 to the battery 251 and the latter to the magnet 243 so that the closure of the circuit at the contacts 272 and 274 energizes the brake applying magnet 243 and stops the motor.

In the circuit 273 between the contact 272 and the magnet 243 there are interposed the contacts 276 comprising a fixed and movable contact normally open but adapted to be closed by an adjustable screw 277 carried by the end of the brake lever 241. When the brake is released the contacts 276 are closed and the brake magnet 243 in readiness to be energized. When the brake lever has been thrown by the energization of the magnet 243, however, and the machine stopped, the stopping circuit is opened at 276, preventing waste of current.

If, when the sound box reaches the end of the record, the selector lever is depressed so that the selector contact 272 is withdrawn from the path of the contact 274, the latter is caused to strike the stationary contact 278, which latter is connected by the conductor 279 with the starting circuit 250, so that the meeting of these two contacts effects the same result as the insertion of a coin and energizes the releasing magnet 34 and the brake releasing magnet 244.

With the selector contact elevated, therefore, all further movement of the machine is stopped when the stylus reaches the end of the sound groove until such a coin is subsequently dropped into the chute. On the other hand, if the selector contact is depressed when the stylus reaches the end of the record, the motor continues to turn, the carrier is released, the sound box returned to its initial position and the carrier moved to bring successive records into position until the selected record is reached.

Referring now to the selecting mechanism, means are provided whereby not only may any desired record be selected automatically in response to the movement of a controller

or director, but, following the selection of one record, other records may be automatically played in succession from either adjacent or different parts of the carrier. This is accomplished by a suitable control of the selecting lever 40. Referring more particularly to Figs. 5, 6, 10, 11 and 12, the selector lever has its rear end normally thrown down to cover the locking apertures in the locking disk 20 by means of the spring 280, but is lifted at appropriate times by controlling devices at the opposite or front end of the lever.

Referring to Figs. 5 and 10 on the front of the machine casing there is pivoted a controller or record designating lever 281 having the handle 282 and carrying in its end the spring-pressed positioning pin 283. The latter is adapted to register with members of a series of notches 284 which are arranged opposite certain numerical designations, 1, 2, 3, 4, etc., referring to different records on the carrier. The lever may be turned to designate any particular record, for example, record No. 4, the positioning pin 283 snapping into the notch thereat and temporarily holding the lever in the position represented in Fig. 10. Such movement of the lever turns the short shaft 285 on which it is mounted (Fig. 5) giving a corresponding movement to the selector arm 286 within the casing. The latter is forked at its upper end to engage a pin 287 and imparts movement to a sliding stop bar 288 which has a sliding support in the lever 40. To support both ends of the slide bar, the lever 40 has the branched portion 289 (see Fig. 6) while the end of the main lever portion 40 is continued in a right-angled bend 290 and terminates in a short projection 291 which serves to lock the designating lever as will be more fully described.

The position of the controlling lever 40 is controlled by engagement with an upright stop member 292 on the stop bar 288 of controlling devices carried by the selector or pattern drum 293. This drum is provided on its circumference with as many pairs of selector pins 294 arranged in sets lengthwise the selector as there are records in the carrier, the number in each set arranged about the periphery being also equal to the number of records.

For a purpose to be described the selector pins are some short and some long and for purposes, also to be described, the stop member is of a peculiar construction (see Figs. 6^b and 6^c) and the pins different in configuration (as shown in Figs. 4^a, 4^b, 4^c and 4^d). The pins are in the form of pegs which may be inserted in suitable holes provided in the face of the drum so that they may be arranged in any predetermined order and position.

Without at present referring to the differ-

ence in shape or configuration of the pins, the operation is as follows: The movement of the designating lever to designate any particular record brings the stop member 5 292 lengthwise the drum in line with the row or set of stop pins corresponding to that record. For example, if the designating lever is moved to designate record No. 5 the pin comes into registration with the fifth 10 row of selector pins. The selector drum 293 is turned in synchronism with the movements of the carrier so that, when any given record is in playing position, the selector pin corresponding to that record will be immediately over the stop member 292. That 15 is to say, with the selector lever moved to select record No. 5, the selector pins in the fifth row on the cylinder will pass in succession over the stop pin 292 as the corresponding records pass through the playing position, the pin corresponding to record No. 5 being brought into operative relation to the stop member when that record is 20 reached. Any suitable means may be employed for this purpose, but herein the drum is mounted upon a drum shaft 296 on which is also fixed the gear 297 (Fig. 6), the latter meshing with the large intermediate gear 298 driven from the small pinion 299 on the 30 carrier sprocket wheel shaft 5.

The particular sequence of movements which follow the selection of the various records are predetermined by the prior arrangement of the selector pins upon the pattern 35 drum, these being set in any suitable position, and the machine then locked up.

If it is desired that any given record, when selected, should be played and the machine then stopped, a long selector pin corresponding to that record on the pattern 40 drum is set to project from the periphery of the drum so that when it engages the stop member 292 it will depress the bar 288 and raise the opposite end of the selector lever 40 to the fullest extent. Accordingly, with the machine set into operation by the insertion of a coin, the selector lever will be elevated as soon as that particular record approaches playing position, not only causing 45 the carrier to be fixed at that point, but raising the cylinder stop contact 272 so that, when the reproducer reaches the end of its run, it will apply the brake and stop the machine.

In such a case all the other selector pins in the corresponding circumferential row are removed from the cylinder so that in all other positions thereof the stop member 292 is held pressed against the circumference of 50 the drum 297, depressing the active end of the selector lever and preventing the locking of the carrier as successive records are brought into playing position, until the particular selected record is reached.

If it is desired that the movement of the

selector lever to any given position should be automatically followed not only by the playing of the corresponding record, but also by the playing of the successive record 70 or records, then a short selector pin corresponding to that record is inserted to project above the surface of the drum. This, when brought into engagement with the stop member 292, causes a partial elevation only of the active end of the selector lever sufficient to expose the locking apertures in the 75 locking disk 20, so that the carrier will be stopped at that point, but insufficient to lift the selector stop contact 272 into the path of the contact 274, so that, when the record is 80 played, instead of the machine being stopped, the carrier will be again released and the motor continue to turn until the record next in succession to be played is reached, whereupon the carrier will be 85 stopped and the same operation repeated, the last record to be played being represented on the pattern roll by a long pin.

For example, if it is desired to play record No. 2 and to follow it with record No. 3 and 90 then with record No. 5, the short pins corresponding to records Nos. 2 and 3 in the second circumferential row of selector pins and the long pin corresponding to record No. 5 will be set to project from the drum, all 95 other pins in that set being removed. With that adjustment, the machine, when started, will play record No. 2 and automatically continue to play record No. 3 and then record No. 5, whereupon it will automatically 100 stop.

This selective control over the records permits the machine to be adjusted so that records having some connection each with the 105 other may be automatically played in succession, or a number of short records may be combined in a single reproduction, or several records such as are played separately for the payment of a coin of low value can be played in succession and automatically 110 upon the payment of a coin of high value.

In order that the machine will always play any predetermined series of records as planned, means are provided whereby the reproduction will always commence with the 115 record which is intended to be the initial record, irrespective of the particular stage at which the machine was last stopped.

For example, in the case supposed where it is desired to play records 2, 3 and then 120 record No. 5, if the machine had been previously stopped with record No. 4 in operative position, then on moving the controller lever to designate the aforesaid series of three records and setting the machine into 125 operation the reproduction would start and stop with record No. 5 unless some provision were made to avoid this.

To this end I have provided distinctive types of pins intended for the initial repro- 130

duction, the final reproduction and intermediate reproduction and have constructed the stop member so that it is intended to cooperate with the particular form of pins employed.

Referring to Figs. 6^b and 6^c, the stop member instead of being a rigid projecting pin or other piece, comprises two pivoted pins 292^x and 292^y which pins are normally held in contact as represented in Fig. 6^b by the springs 292^z. These pins or ears are beveled at their contacting edges on the side where engaged by the pattern drum pins and when suitably engaged thereby may be wedged apart, in which position they are retained by the springs 292^z. Any tendency to force the pins toward each other, however, results in their snapping together into the position shown so that the pins may be readily snapped apart or together.

The pattern drum pin which is utilized to initiate the reproduction of a series of records is of the form shown at 294^a in Fig. 4^a, this being a short pin and having a wedge-shaped head which on engaging with the ears 292^x and 292^y first wedges the same apart and then depresses them, the ears resting upon the topmost flattened face of the pin when the record is locked and played.

When the record has been played, the machine continues to turn and if the next designated record is to be succeeded by others its position is marked by a pin like that at 294^b shown in Fig. 4^b. This pin is of U-shaped cross section but with beveled inclined sides so that the spread or opened ears engage the wedge-shaped sides and are depressed thereby. This pin is also a short pin. All intermediate records of a series are designated by this type of pin.

The final record of a series to be played is designated by a pin of the type shown at 294^d in Fig. 4^d, this pin being a long pin to terminate the reproduction and being of similar shape to the pin 294^b except as each side is provided with an arch-like extension which, when the machine is next operated, moves the ears toward each other and causes them to snap back to their initial position.

The result is that at the final termination of the reproduction of any record or series of records, the ears are left in contact with each other. On the other hand, after the reproduction of a series of records has been commenced the ears are spread apart and remain so until the reproduction is terminated. The result is that the reproduction of a series of records cannot be initiated by an intermediate pin 294^b or a terminating pin 294^d for the closed-in ears readily pass between the sides of the pins without depression thereby. These reproductions can only be initiated by a pin having the configuration shown in 294^a.

If it is desired to play a single record only and then stop the machine, a pin 294^c like that shown in Fig. 4^c is utilized to designate the record, such pin being a long pin and acting to depress the closed-in ears, leaving their relation unaffected. If a record is to be skipped, its pin is, of course, removed, resulting in the carrier being shifted past that particular position.

In order to indicate to the user of the machine the particular record for which the carrier is set at any given time and also to indicate a proper response of the carrier to any given selection, suitable indicating means are provided which automatically follow the movements of the carrier. While any suitable mechanism may be used for this purpose, herein directly over the numerical designations of the records and behind the glass wall 300 there is caused to move a pointer 301 which indicates the particular record in playing position. This pointer (Fig. 5) is carried by the swinging indicator segment 302, the latter fulcrumed to swing about the selector shaft 285 and turned in response to movements of the selector drum by mechanism as follows:

On the end of the selector drum shaft 296, (Fig. 6) there is provided the edge cam 303 against which bears the cam roll 304 carried by the upright lever arm 305 (Fig. 11) pivoted at 306 on the frame. The lower end of the lever is connected by the link 307 to the indicator segment so that as the cam is turned with the drum, the segment swings through a corresponding angle and moves the indicator pointer to designate the record then in playing position. The cam roll is held against the cam by the spring 308, one end of which is fixed to the frame and the opposite end connected to the segment to draw the same toward the position of record No. 1.

Preferably means are employed to lock the designating lever against accidental or intentional displacement at all times when the machine is in automatic operation except when the carrier is locked. To this end the projecting or locking end 291 of the selector lever is caused to register with a series of slots 309 (Fig. 11) formed in a sliding locking plate 310. The plate is given movement by the designating lever through means of a pin 312 which passes through an arc-shaped slot 313 in the case and works in a vertical slot 314 in the locking plate. When the designating lever is moved into position to select or designate any record one of the notches 309 is brought immediately over the locking projection 291 so that as soon as the carrier starts moving and the drum turning, the selector lever moves to lift the projection into the notch and lock the locking plate and designating lever against further movement until such

time as a long selector pin on the drum depresses the selector lever to the fullest extent and the carrier becomes locked.

In some instances where the machine is not employed in connection with prepayment devices, it is desirable to make provision for the continuous playing of successive records. For this purpose provision is herein made whereby the forward end of the selector lever can be depressed for any desired period irrespective of the position of the designating lever or the arrangement of the pins in the selector drum. Herein this is accomplished by the provision of a vertically sliding, arc-shaped locking plate 320 (Figs. 5 and 11) carried by the indicator segment and overlying the projection 291 on the selector lever. Such plate is normally drawn up by springs 321 out of engagement with the selector lever, but may be depressed and held depressed by means of the latch 322 which (Fig. 5) has a shoulder 323 adapted to catch on the edge 324 of the indicator segment to hold the selector lever down. A spring 325 holds the latch against the edge 324 but it may be released at will. Access to the latch is normally prevented by the closure 326 in the casing which will customarily be locked up, but the latch may be reached by authorized persons through the closure to provide for continuous playing of records in succession without the necessity of further manipulation of the machine.

For the purposes of trial or inspection, or for the use of the machine apart from the prepayment devices, means may be also provided for starting the machine into operation irrespective of the coin-controlled contacts. Such means are shown diagrammatically in Fig. 9 as comprising the button or switch 330 arranged in a branch circuit 331 of the starting circuit 250 so that by closing the switch the machine can be started in all respects the same as by the insertion of a coin. Such button may be provided in any suitable part of the machine, or if used in connection with prepayment devices may be reached through the closure 326.

While the machine is intended to reproduce certain records of the prepayment of a coin of one value, and other records through the prepayment of a coin of higher value so that two or more prepayment receptacles are present, means are preferably provided whereby the designation of any particular record or records closes all but the prepayment receptacle which is suitable or appropriate to receive prepayment for the record or records selected.

Referring to the illustrated form of machine and particularly to Figs. 5 and 11 where two coin chutes are employed, 252 for the coin of lower value, as for example,

one cent, and the other, 253, for a coin of higher value, as for example five cents, a controlling plate or shutter 340 is provided pivoted at 341. Such plate has two positions in one of which (the upper position shown in full lines) the mouth of the five-cent chute is closed while the mouth of the one-cent chute is opened by means of the slot 342 in the plate. In the lower position (shown in dotted lines) the mouth of the one-cent chute is closed and the mouth of the five-cent chute uncovered. To position the plate with reference to the selected record or records the same is connected to the downwardly extending link 343 connected at its lower end to the lever arm 344, the latter fulcrumed at 345 to the frame. The link is normally drawn toward a stop pin 346 by a spring 347, but may be held down to the full line position shown to open the one-cent chute through the abutment of the lug or projection 348 carried by the lever against the projecting end of one of the series of pins 349 arranged in the chute controlling disk 350. As many pins are provided as there are records on the carrier and the disk is pinned or otherwise secured to the selector shaft 285 so that, when the designating handle 251 is turned to indicate any particular record, the chute-controlling pin for that record is brought immediately over the lug 348. The pins are each provided with a pair of circumferential notches (Fig. 5) adapted to be engaged by a short spring finger 351 fastened to the face of the disk so that the pin can be snapped and held either in the position shown or in a position where the head does not project from the inner face of the disk and does not therefore offer any opposition to the upward movement of the lug 348.

If, therefore, the pins are prearranged so that those corresponding to the records of lower valuation project into the path of the lug while those corresponding to records of the higher valuation do not project into the path of the lug, the movement of the selector arm to any given position will simultaneously position the chute controller to expose the appropriate coin chute for prepayment.

Referring now more particularly to the reproducing mechanism, it often becomes desirable to shift, change, or adjust parts of the reproducing mechanism, as for example, the diaphragm or other reproducing elements, after playing one record and before playing another and with reference to the particular requirements or characteristics of the individual records so that each record may be reproduced under the best conditions and with the highest efficiency. Herein, I have provided means whereby prior to the playing of any given record,

parts of the sound reproducing apparatus may be automatically adjusted with particular reference to the record about to be played.

5 Referring to the drawings and more particularly to Figs. 6, 8 and 12, the sound box arm 101 has a prolongation 360 which carries an upright stud 361, the latter being provided with the ball bearing 362 adapted to travel along the fixed rail 363 on the machine. This stud provides a swivel support for adjusting diaphragm frame 364 which latter is provided with a plurality of diaphragms, herein three in number, 365, 10 366, 367, which may be brought successively into operative position within the sound box, the middle diaphragm 366 being herein shown in that position. These diaphragms are differently tuned or pitched so that while one is best for a record having certain characteristics, another is better fitted for a different characteristic of another record, and so on. In connection with the multiple diaphragm holder, means 20 are provided whereby that diaphragm best fitted for the record about to be played is automatically moved into operative position in the sound box. Herein, for such purposes the diaphragm arm 364 carries an armature 368 which is adapted to span but not quite touch the poles of any two adjacent magnets of the set of four, 369, 370, 371 and 372. These magnets are fixed on the prolongation 360 of the reproducer 25 arm and alternate in polarity so that the energization of any two adjacent magnets attracts the armature and swings the corresponding diaphragm into position. A yieldable spring-pressed positioning pin 373 in one of three perforations of the swinging arm serves to maintain the arm in the position to which it is adjusted.

To control individually the position of the diaphragm arm, each record retainer (Fig. 3) is provided with a pivoted contact clip 374 having an outwardly projecting end and so located that just prior to the record reaching a playing position the clip is caused to strike one of the three sets of contacts 375, 376, 377, fixed upon the rail 146 so that a suitable controlling circuit is thereby closed. Each contact pair comprises an upper and lower contact as represented diagrammatically in Fig. 12, one pole of the battery being 55 connected to magnets 369 and 371 in multiple and the other to the magnets 370 and 372 in multiple. The remaining terminal of the magnet 369 is connected to one contact of the pair 375, the other member of the pair being connected to the terminal of magnet 370, which latter is also connected to one of the contacts 376. The remaining contact of the pair 376 is connected in multiple with one of the contacts 377 to the terminal of 65 the magnet 371, while the remaining contact

of the pair 377 is connected to the terminal of the magnet 372.

It therefore follows that if the adjustable contact 374 on any given record retainer is set to close the contacts 375, the magnets 369 and 370 will be energized and the diaphragm 365 placed in operative position. If a record retainer approaches with the clip adjusted to close the contacts 376, the diaphragm 366 will be operatively positioned, or if the contacts 377, then the diaphragm 367. 70 75

By adjusting the clip 374 on the individual retainers with reference to the particular record carried by each, such record may be played by means of the diaphragm selected particularly with reference to that individual record. 80

Other alterations or adjustments in the reproducing parts having reference to the individual records may be automatically employed, and I have herein also shown means (Fig. 5^a) for adjustably moving a throat 380 in the sound box toward or from the diaphragm so that the sound orifice is located more or less remote from the diaphragm, thereby varying the quality of the tone. The throat 380 is in the form of a tube adapted to be moved axially within the tubular casing of the sound box by the arm 381 carrying the armature 382, the latter being operatively related to the three magnets 384, 385, 386 (Figs. 5^a and 6) arranged at different heights so that as one or the other magnets is energized the vertical position of the arm 381 is shifted and the throat thereby raised or lowered. The selected energization of the magnets gives three positions to the arm to suit three different classes of records, but obviously means may also be employed for adjusting it to still other positions or otherwise changing the configuration of the sound passages or the relation of the sound box parts. 90 95 100 105

To selectively energize the magnets with reference to the characteristics of the individual records, a third pivoted contact clip 387 is employed upon each retainer which may be adjusted like the clip 374 operatively to engage pairs of contacts 388, 389 and 390 carried by the fixed rail 146. Each pair comprises an upper contact connected to one of the three magnets and a lower contact, the latter connected to a battery, the opposite pole of which is connected in multiple to the remaining terminals of the said magnets. 110 115 120

It may sometimes be desired to play records of different length or other dimensions than those for which the disclosed machine is actually constructed. In order to render this possible, I have herein provided adapting means whereby records shorter than those for which the machine is constructed are utilized. 125

Referring to Fig. 2, I have therein shown a record 400 which is of lesser length than 130

the record 1, but may, nevertheless, be utilized in the machine which has the record by the application to each end of the record of an adapting device consisting of the annular sheet metal adapter 401, each of sufficient length to compensate for one-half the decreased length of the record and having an end formation so that it can be engaged by the record engaging disks 42 and 44 just as are the records 1. Each adapter is applied to and retained upon its record by means of the interiorly projecting spring expansion means 402, which may be inserted within tubular records and serve to hold the adapter thereon by gripping the inner walls of the shell.

Referring now to the relation of the stylus to the diaphragm, the former is shown at 410 (Fig. 8) carried by the stylus lever 411 which latter has the upright connection 412 passing through the perforated, horizontal bar 413 and has its end in contact with the particular diaphragm which happens to be in operative position but free therefrom so that the diaphragms can be shifted one or another into contact with the connection 412. The stylus lever 411 is pivoted to the tension arm 414, the latter being pivoted to the swiveled block 415 and depressed so as to depress or tension the stylus against the record by means of the coiled spring 416, the latter being positioned between the tension arm 414 and the adjustable abutment 417. The latter is in the form of a flat spring arm adapted to be adjusted by means of the adjustable screw 418 so that the degree of compression of the spring 416 and therefore the tension of the stylus can be varied at will.

If desired means may be employed whereby the stylus, instead of being dropped upon the record at the same spot and lifted from the same place in each record, may be variably lowered and raised, the time of raising or lowering, or both, being automatically selected with reference to the beginning and ending of the record groove in each instance. In the event that long and short records are both employed upon the same carrier or records wherein the length of groove differs materially for different records, such provision eliminates an unnecessarily long wait between the playing of successive records. It also insures the elimination of the prolonged series of noises usually preceding and following the playing of a record due to the stylus engaging with parts of the record surface other than the record groove. Furthermore, where one record is succeeded by a second which serves as a prolongation of the first, the interruption between the two will be reduced to a minimum.

For the purpose of adjusting the engagement of the stylus with the separate records with reference to the beginning and end-

ing of each record groove, I have herein provided a supplemental set of contacts upon the sound box which corresponds to the contacts 259 and 274 and supplemental sets of contacts one for each record retainer which corresponds to the contacts 260, 272, 278. By means of these contacts the playing will be stopped at or approximately at the end of the record groove in each case and commence at or approximately at the beginning of the groove in each case. To lower the sound box at the right point in the case of each record, the sound box is provided with a contact 420 supported by the swinging arm 421, the latter pivoted (see Figs. 5, 6 and 7) at 422 upon a prolongation 360 of the sound box carrying arm.

Such contact is connected in multiple (see Fig. 9) with the contact 259 also carried by the sound box and is adapted to coöperate with the members in a series of contacts 423 adjustably mounted one upon each of the record retainers. Each contact comprises a small spring clip which can be adjustably fastened over the edge of the record retainer at a distance from the edge thereof dependent on the character of the record carried thereby. When the sound box is lifted, as it is when undergoing its return movement, the contact carrying arm 421 slides over the edge of the record container, the contact 423 lying in the path of the contact 420. When the two meet the magnet 122 is energized, the latch 120 thrown and the sound box dropped as previously described. The adjusted position of the contact clip 423 obviously determines the point along the sound record where the stylus is lowered. The contacts 423 are connected to the battery by means of the ground wire 262 grounded to the frame of the machine. When the record carrier shifts the contact carrying arm 421 lifts and slides over the edge of the record retainer.

To control the cessation of playing, the sound box is provided with the contact 424 connected in multiple to the stationary contact 278 and the contact 425 connected in multiple with the selector controlled contact 272. These coöperate (see Figs. 8 and 9) respectively with the adjustable contact clips 426 and 427 adjustably secured upon the edge of the record retainer opposite the edge to which the contact 423 is fastened and near the opposite end of the retainer so as to touch their respective contacts 424 or 425 as the case may be when the stylus is at the end of the record groove. When it is desired that the stylus shall not travel for the full extent permitted by the contacts 272 and 278 the record retainer is equipped with one or the other contacts 426 and 427. If it is desired that the machine shall stop after the record has been played its retainer is provided with one of the contacts 427 so

positioned that it will touch the contact 425 on the sound box when the stylus has reached the end of the record groove. If, however, it is desired that the playing of the record shall be followed by the playing of another record before the machine stops its retainer is provided with one of the contacts 426 so positioned that it will touch the contact 424 on the sound box when the stylus has reached the end of the record groove. The provision of the contact 427 stops the machine and applies the brake, while the provision of the contact 426 causes the carrier to be shifted for the positioning of another record immediately on the cessation of playing. Preferably the contact 424 is shorter than the contact 425 so that it will not touch or interfere with the contact 427 if the latter be present.

It will of course be understood that many features of my invention herein described are applicable to types of sound reproducing or sound recording machines other than the one which is here taken for purposes of illustration, and that such features of my invention either modified or as described, may be applied to such machines without reference to the presence or absence of the remaining features of said invention. It will also be understood that while I have described with considerable detail for illustrative purposes one practical embodiment of my invention, the same is not limited to the details described, or the form, relation, or construction of parts, but that many and wide modifications may be made therein without departing from the spirit of my invention.

Claims:

1. A multiple record phonograph having a record carrier comprising flexible carrying means having a plurality of record retainers, each being adapted to hold a cylindrical record resting loosely therein.

2. A multiple record phonograph having a record carrier, a carrier turning shaft, an apertured locking disk carried thereby, a bolt for engaging the locking disk, and automatic means for controlling said bolt to cause it to enter any given aperture.

3. In a multiple record phonograph the combination with a carrier having a plurality of positions, locking means for locking the carrier in each successive position to play the records in succession and means for rendering said locking means inoperative for any given position to play said records out of their fixed order.

4. In a multiple record phonograph, the combination with a carrier, carrier locking means and means to obstruct the carrier locking means.

5. A multiple record phonograph comprising a record carrier for carrying a plurality of cylindrical records, means for

bringing the records successively into approximate playing position in the orbit of said carrier, and means for freeing a record from the carrier by moving the carrier.

6. A multiple record phonograph having a record carrier for carrying a plurality of cylindrical records, means for bringing the records successively into playing position, and means for distorting the carrier to release the records so brought into playing position.

7. A multiple record phonograph having a record carrier, and means for simultaneously lifting a record from the carrier and moving the carrier to further relieve the record.

8. A multiple record phonograph having a record carrier and means for freeing a record from the carrier including means engaging the carrier.

9. A multiple record phonograph having a record carrier and means for freeing a record from the carrier including means engaging and moving the carrier.

10. A multiple record phonograph having a record carrier, and means to engage the ends of a given record and free the same from the carrier and to simultaneously engage and move the carrier.

11. In a multiple record phonograph, the combination with a multiple record carrier, means for bringing the carrier into operative position, and means for simultaneously lifting the record and depressing the carrier.

12. A multiple record phonograph having a flexible carrier, a sprocket driving wheel provided with depressions, and gripping means to force the carrier into said depressions.

13. In a multiple record phonograph, the combination with a carrier, locking means for locking the carrier, means for engaging the carrier to move the same away from the record in playing position, and means to disengage the carrier simultaneously with the unlocking of the same.

14. In a multiple record phonograph, the combination with means for holding a plurality of records, sound reproducing means, means for causing the traverse of said sound reproducing means relatively to said records in succession, and means for automatically varying the speed of traverse with reference to the particular record played.

15. In a phonograph, the combination with a record holder, of sound reproducing means, means for causing relative traverse between the record and the sound reproducing means, and means controlled by the record holder for automatically changing the speed of traverse.

16. In a multiple record phonograph, the combination with means for holding a plurality of records, reproducing means including a stylus, means to produce travel thereof,

and means for automatically changing the speed of stylus travel to suit the requirements of different records.

17. A multiple record phonograph having a plurality of records and means for presenting them in succession to the reproducing mechanism, and means for predeterminately skipping a record.

18. A multiple record phonograph having a plurality of records, reproducing mechanism, and means for automatically bringing said reproducing mechanism and records into coöperative relation to play records in succession in any given predetermined order.

19. In a multiple record phonograph, the combination with means for holding a series of records, of means for predeterminately controlling the machine to cause it to play a plurality of selected records irrespective of their order in the holder and means to stop the machine on the completion of a selected record.

20. In a multiple record phonograph, the combination with a record carrier, means for advancing the record carrier step by step to bring successive records in playing position, means for reproducing a record thus brought into position, and automatic selector means to cause the passage of the carrier through successive steps, prior to the reproduction of a record, thereby to select the predetermined record for reproduction.

21. A multiple record phonograph having a plurality of records, reproducing mechanism, a controller adjustable to positions corresponding to predetermined selections of records to be reproduced, and means for automatically causing the reproduction of certain predetermined records only in response to a movement of the controller.

22. A multiple record phonograph having a plurality of records, motor-driven record-shifting means to bring them successively into operative position, a controller, and means controlling the shifting mechanism to render the same responsive to the position of the controller and bringing a selected record into operative position.

23. In a multiple record phonograph, the combination with a record carrier, motor driven means for moving the carrier to shift the records, locking means and hand operated selecting means arranged to inhibit action of said locking means except with reference to a selected record.

24. A multiple record phonograph having a record carrier, a pattern member, reproducing means, and means through said pattern member for controlling the order of reproduction of said records.

25. In a multiple record phonograph, the combination with means for holding a plurality of records, automatic means for presenting them to reproducing mechanism, said phonograph being capable of playing

the records continuously in succession and of playing them in predetermined order and selection, and means for determining the method of operation of the phonograph.

26. In a multiple record phonograph, the combination with means for holding a plurality of records, reproducing mechanisms of different character, and means for shifting the reproducing mechanism in accordance with the characteristics of the individual record to be played upon the presentation thereof.

27. In a multiple record phonograph, the combination with reproducing mechanism having a plurality of diaphragms, means for holding a plurality of records, and means for automatically shifting the diaphragms dependent on the record to be played.

28. In a multiple record phonograph, the combination with means for presenting to the reproducing mechanism any one of a plurality of records, reproducing means adjustable as to the acoustic character of the reproduction and automatic means for adjusting the reproducing mechanism to harmonize the character of the reproduction with the character of the matter played.

29. In a multiple record phonograph, the combination with means for presenting in succession a plurality of records to the reproducing mechanism, reproducing mechanism including an adjustable throat, and means controlled by the record presenting mechanism for automatically adjusting the throat dependent on the characteristics of the individual record to be played.

30. In a multiple record phonograph, the combination with means for holding a plurality of records, selector means for selecting at one operation any two or more records to be automatically played successively.

31. In a multiple record phonograph for playing a series of records, the combination with means for selecting in advance certain members of the series independent of their original serial position in the machine, of means for automatically playing said selected members in succession.

32. A multiple record sound-reproducing machine comprising, in combination, a carrier having record holders, adjustable members on said holders and mechanism sensitive to the adjustment of said members to vary the acoustic qualities of the reproduction.

33. A multiple record sound-reproducing machine comprising, in combination, a carrier having record holders, adjustable contact members on said holders, electric circuits arranged for closure by said contacts in certain conditions of adjustment and devices controlled by the energy of said circuits for varying the acoustic qualities of the reproduction.

34. A multiple record sound-reproducing machine comprising, in combination, a rec

ord carrier movable to present records for reproduction, a lock to hold said carrier in position with a record so presented comprising interengaging male and female members and a device adjustable for interposition between said members to prevent the operation of said lock.

35. A multiple record sound-reproducing machine comprising, in combination, a record carrier movable to present records for reproduction, a lock to hold said carrier in position with a record so presented comprising interengaging male and female members and a device adjustable for interposition between said members to prevent the operation of said lock and a pattern drum controlling the operation of said device.

36. In a device of the class described a selector, controlling mechanism comprising a tappet the depression of which actuates the selector, said tappet being formed in two parts having closed and spread positions, and a pattern member for actuating said tappet provided with combinations of the following tappet depressing members:—a series opening member adapted to move said parts to spread position, an intermediate member channeled to depress said tappet in spread condition and pass it in closed condition, and a series-closing member also acting

to depress said tappet in spaced condition and pass it in closed condition and further acting to return the parts to closed condition.

37. In a device of the class described a selector, controlling mechanism comprising a tappet the depression of which actuates the selector, said tappet being formed in two parts having closed and spread positions, and a pattern member for actuating said tappet provided with combinations of the following tappet depressing members:—a series-opening member adapted to move said parts to spread position, an intermediate member channeled to depress said tappet in spread condition and pass it in closed condition, and a series closing member also acting to depress said tappet in spaced condition and pass it in closed condition and further acting to return the parts to closed condition, and an individual selector member actuating said tappet in closed condition without altering the same.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE H. UNDERHILL.

Witnesses:

THOMAS B. BOOTH,
ROBERT H. KAMMLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

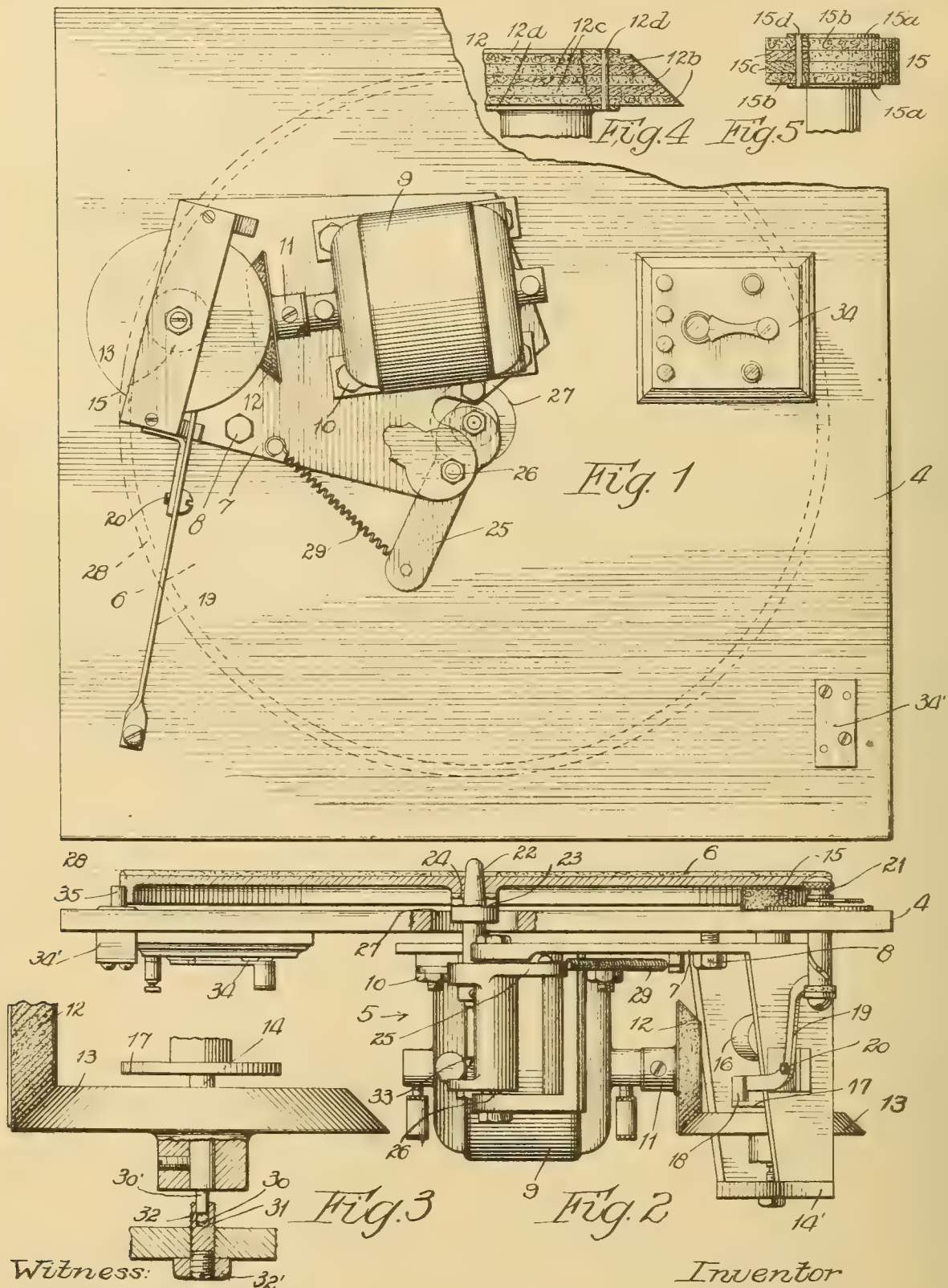
PHONOGRAPHIC DRIVING MECHANISM.

1,265,115 ----- C. F. Roberts,
Filed Aug. 28, 1916,
Patented May 7, 1918.

C. F. ROBERTS.
 PHONOGRAPHIC DRIVING MECHANISM.
 APPLICATION FILED AUG. 28, 1916.

1,265,115.

Patented May 7, 1918.



Witness:
 Albin C. Ahlberg.
 A. J. McCall.

Inventor
 Charles F. Roberts
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 Attorneys

UNITED STATES PATENT OFFICE.

CHARLES F. ROBERTS, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHICAGO METAL PRODUCTS CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPHIC DRIVING MECHANISM.

1,265,115.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed August 28, 1916. Serial No. 117,172.

To all whom it may concern:

Be it known that I, CHARLES F. ROBERTS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Phonographic Driving Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to phonographic driving mechanisms and has for one of its objects the elimination of the usual gearing employed for driving the record turn table to produce an entirely noiseless device and to provide driving mechanism which needs comparatively little lubrication for operation.

A further object of the device is to drive the turn table so that wobbling or oscillation of the same is eliminated and to produce a construction such that the turn table will substantially instantly after starting of the motor attain a speed which is necessary to properly reproduce the selection on the record.

A further object of the invention is the provision of a combined driving wheel and fly wheel associated with the centrifugal governor for causing the turn table to revolve at an unfluctuating rate of speed.

A further object of the invention is the provision of novel bearing mechanism for journaling the operating shafts of the driving mechanism. To accomplish the above objects I preferably employ an electric motor secured to the underside of the turn table board. This motor is frictionally connected with a centrifugal device, which device contains a shaft extending through the motor board and provided on the side of the board opposite the motor with a friction wheel arranged to engage the periphery of the turn table. Mechanism is employed for moving the turn table in a plane normal to its axis of rotation and in a direction to normally maintain its periphery in frictional driving engagement with the friction wheel driven by the electric motor.

These and other objects of my invention will be more clearly brought out in con-

nection with the accompanying drawings in which—

Figure 1 is a bottom view of the motor board and the driving mechanism carried thereby;

Fig. 2 is a side elevational view of Fig. 1, some of the parts being broken away to more clearly illustrate their construction;

Fig. 3 is a detailed view of the combined driving wheel and fly wheel and the improved bearing for journaling the fly wheel shaft; and

Figs. 4 and 5 are detail sectional views of two of the frictional driving wheels forming a part of the apparatus of my invention.

Similar characters of reference refer to similar parts throughout the several views.

The usual motor board to which the driving mechanism is attached is illustrated at 4, the improved driving mechanism of my invention at 5 on the underside of the board and the record turn table at 6 on the upper side of the board. The driving mechanism 5 consists of a supporting plate 7 attached by means of screws 8 to the underside of the board 4. An electric motor 9 is supported from the supporting plate 7 by means of the screws and nuts illustrated at 10. 11 illustrates the operating shaft of the electric motor which shaft carries at one end a beveled friction wheel 12. This friction wheel has its engaging surface made up of a soft pliable material, conveniently sponge rubber, but which may be of felt or leather or a combination of any two or all of these materials, and is adapted to have driving connection with the metallic or fiber beveled fly wheel 13 mounted on the centrifugal shaft 14. The shaft 14 is journaled as most clearly illustrated in Fig. 2 in the supporting member 7 and the plate 14' attached to the member 7.

In Fig. 4 I have illustrated a preferred construction for the friction wheel 12. As shown in this figure the wheel 12 comprises metal side plates or disks 12^a between which laminæ 12^b and 12^c are clamped by a plurality of pins or screws 12^d. The several laminæ 12^b are desirably of pliable leather such as sheepskin and the laminæ 12^c are of sponge rubber, although laminæ 12^c may be of soft felt if desired. I find that the com-

bination of the leather laminae 12^b with intervening laminae of one of the more resilient materials mentioned affords an excellent wheel for my present purpose.

5 The upper end of the shaft 14 extends through the motor board 4 and is provided at its upper extremity with a friction wheel 15, which, like the friction wheel 12, carries an engaging surface composed of pliable material. The wheel 15 is desirably of the construction shown in Fig. 5 wherein laminae 15^b and 15^c of sheepskin and sponge rubber respectively are clamped between disks 15^a by securing devices 15^d. Felt may be substituted for the sponge rubber if desired. The shaft 14 is arranged to operate the centrifugal mechanism 16, operatively associated with the disk 17, arranged when moved upwardly by the centrifugal device to engage the brake shoe 18. The brake shoe 18 is controlled in the usual manner by the lever 19 pivoted at 20 to the support 7, the end of the lever opposite the brake shoe being operated through a finger piece 21, positioned so as to be conveniently manually operated.

The turn table 6 is mounted on the shaft 22 and may be frictionally connected therewith or may be provided with the slot 23 arranged to straddle the pins 24 carried by the shaft 22 and thus provide a positive connection between the shaft and turn table. The shaft 22 extends downwardly and is journaled in the lever arm 25 in turn pivoted at 26 for horizontal movement upon the supporting plate 7. The shaft 22 as illustrated in Figs. 1 and 2 extends through a relatively large aperture 27 provided in the motor board 4 to permit the shaft 22 to have horizontal movement relative to the board.

The turn table 6 is provided with the downwardly extending flange 28, the inside face of which is arranged to frictionally engage the driving wheel 15. To maintain constantly a driving connection between the flange 28 and the driving wheel 15 a tension spring 29 is interposed between one end of the lever 25 and the supporting member 7, the tendency of the spring being to rotate the lever 25 in a clockwise direction (Fig. 1). It will thus be seen that due to the tendency to rotate the lever 25 and thus the shaft 22 and turn table 6 the flange 28 is always held in frictional contact with the driving wheel 15.

The bearing for journaling the lower end of the centrifugal shaft 14 and of the fly wheel 13 is illustrated in Fig. 3, and consists of a projection 30' formed integral with the shaft 14, resting on the ball 30 carried in the recess 31 of the adjustable screw 32. By operating the screw 32 the bearing may be adjusted and any lost motion present eliminated. The screw may be

held in the desired position by tightening the locking nut 32'. The lower end of the shaft 22 is provided with a bearing comprising an adjustable screw 33, which takes the weight of the shaft, the turn table, the record, and in some instances the phonographic reproducer.

I prefer to employ an electric motor which is adaptable to either direct or alternating current, and to afford the necessary electrical connections for the available current the switching mechanism 34 is provided on the underside of the motor board 4. When the device is installed this switch 34 is set to provide the necessary electrical connections for the available current and ordinarily is not used after such setting. To control the operation of the motor a second electrical switch is provided at 34' mounted on the underside of the motor board 4 and containing finger pieces 35 extending through the motor board.

By the provision of the mechanism described it will be observed that constant lubrication of the parts is eliminated, the friction wheels 12 and 13 requiring no lubrication and the bearing mechanism illustrated in Fig. 3 very little, if any. Attention is also directed to the fact that due to the method of driving the turn table at its periphery, wobbling or oscillation of the turn table is prevented, even if there exists a loose connection between the turn table and the shaft 22, which would otherwise permit such wobbling.

Due to the fact that the driving mechanism is connected with the turn table at its periphery the turn table may substantially instantly be given the necessary speed of rotation. By the provision of the fly wheel 13 which is mounted on the driving shaft 14 the turn table, and thus the record, is driven at a uniform rate of speed which, of course, is necessary in the proper reproduction of the selection.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a phonograph the combination of a driving motor, a friction driving wheel driven thereby, a record turn table having frictional engagement with said wheel to be driven thereby, a shaft for said turn table movable in a plane normal to the axis of its rotation and spring means tending to move the shaft and thus the turn table in a direction to provide a frictional driving connection between the turn table and friction wheel.

2. A phonograph including a driving motor, a friction driving wheel driven thereby, a record turn table shaft movable in a direction normal to its axis, a driven wheel mounted on the shaft, said wheel having frictional engagement with said driving

wheel and means tending to move the shaft and thus the driven wheel in a direction to provide a frictional driving connection between the wheels.

5 3. A phonographic driving mechanism comprising a motor board, a driving motor mounted on one side of said board, a record
10 turn table positioned on the other side thereof, a shaft for said turn table extending through an aperture in the board, a
15 bearing for said shaft disposed on the side of said board opposite the turn table, said turn table being provided with a downwardly extending flange around its periph-
20 ery, a friction wheel driven by said motor and disposed under the turn table against the inner face of said flange, and means tending to move the said bearing and thus the shaft and turn table in a direction to
25 provide a frictional driving connection between the turn table and friction wheel.

4. In a phonograph the combination of an electric motor, a friction wheel driven thereby, a record turn table provided with
25 a downwardly extending flange around its periphery, the inside face of said flange having engagement with said friction wheel and means tending to move the axis of rotation of said turn table away from said friction
30 wheel to provide a frictional driving connection between the turn table and friction wheel.

5. In a phonograph the combination of an electric motor, a friction wheel driven
35 thereby, a record turn table provided with a downwardly extending flange around its periphery, the inside face of said flange having engagement with said friction wheel and a spring tending to move the center of said
40 turn table away from said friction wheel to provide a frictional driving connection between the turn table and friction wheel.

6. A phonograph comprising a motor board, an electric motor supported from the
45 underside thereof and having its operating shaft lying in a plane substantially parallel with the board, a second shaft extending through the board and driven by said motor, a friction wheel mounted on the end of
50 said second shaft which terminates on the upperside of the board, a record turn table on the upperside of the board, a shaft therefor journaled in a movable arm, said turn

table being provided with a downwardly extending flange around its periphery, the
55 inside face of which engaging the said friction wheel, and means tending to move the movable arm and thus the turn table in a direction to provide a frictional driving connection between the turn table and wheel. 60

7. A phonograph comprising a motor board, an electric motor supported from the underside thereof and having its operating shaft lying in a plane substantially parallel
65 with the board, a second shaft extending through the board and driven by said motor, a friction wheel mounted on the end of said second shaft which terminates on the upperside of the board, speed governor mechanism for said shaft, a record turn table on the
70 upperside of the board, a shaft therefor journaled in a movable arm, said turn table being provided with a downwardly extending flange around its periphery, the inside face of which engaging the said friction
75 wheel, and means tending to move the movable arm and thus the turn table in a direction to provide a frictional driving connection between the turn table and wheel.

8. A phonograph comprising a motor
80 board, an electric motor supported from the underside thereof and having its operating shaft lying in a plane substantially parallel with the board, a second shaft extending through the board and driven by said motor,
85 a friction wheel mounted on the end of said second shaft which terminates on the upperside of the board, a fly wheel mounted on said shaft, a record turn table on the upperside of the board, a shaft therefor journaled
90 in a movable arm, said turn table being provided with a downwardly extending flange around its periphery, the inside face of which engaging the said friction wheel, and means tending to move the movable arm
95 and thus the turn table in a direction to provide a frictional driving connection between the turn table and wheel.

In witness whereof, I hereunto subscribe my name this 24th day of August, A. D. 100
1916.

CHARLES F. ROBERTS.

Witnesses:

ALBIN C. AHLBERG,
A. G. McCALEB.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



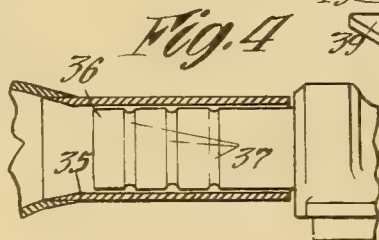
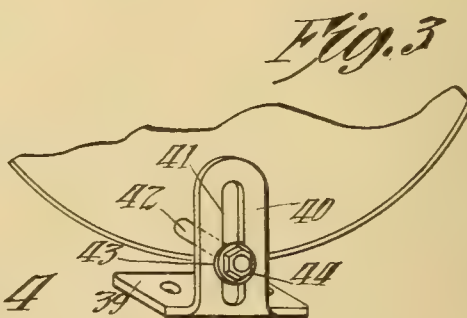
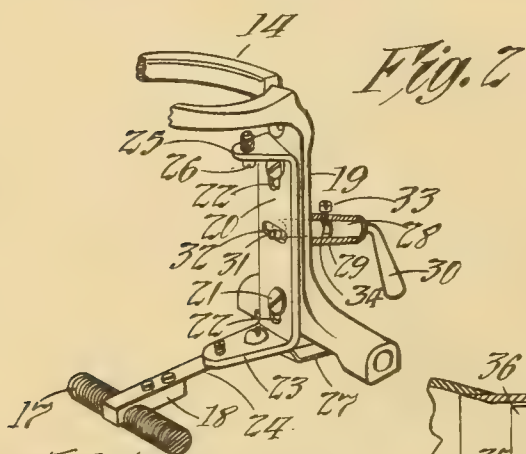
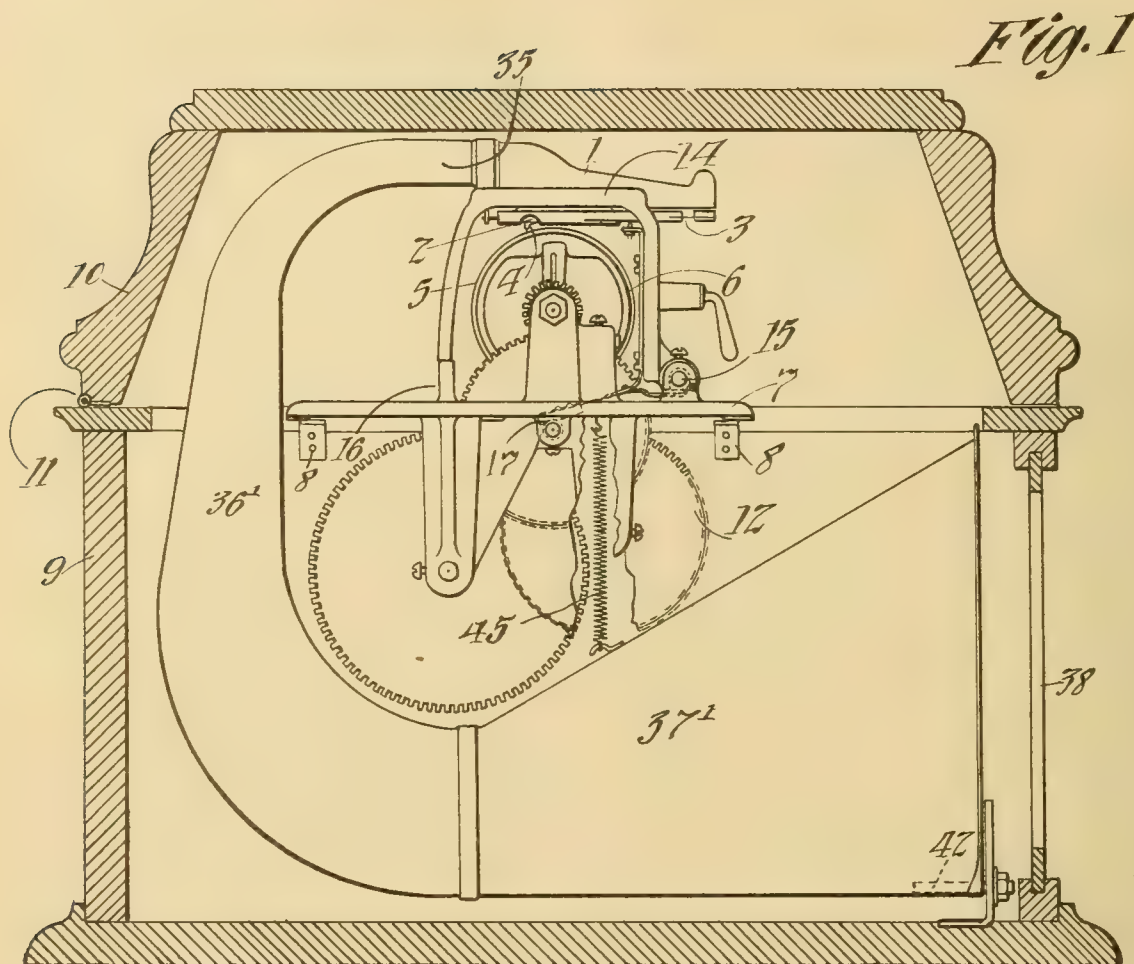
PHONOGRAPH OR TALKING MACHINE.

1,265,179 ----- J. P. Constable,
Filed June 21, 1915,
Patented May 7, 1918.

J. P. CONSTABLE.
 PHONOGRAPH OR TALKING MACHINE.
 APPLICATION FILED JUNE 21, 1915.

1,265,179.

Patented May 7, 1918.



Witnesses:

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PHONOGRAPH OR TALKING-MACHINE.

1.265,179.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed June 21, 1915. Serial No. 35,265.

To all whom it may concern:

Be it known that I, JOHN P. CONSTABLE, a citizen of the United States, and a resident of Llewellyn Park, West Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Phonographs or Talking-Machines, of which the following is a specification.

My invention relates to phonographs or talking machines. The principal object of the invention is to provide an improved mounting for the horn or sound conveyer which forms a part of the phonograph or talking machine. In the preferred form of my invention, the phonograph reproducer is caused to move across the record by mechanical feeding means, and another object of the invention is to provide improved means for rendering the mechanical feeding means inoperative and for disengaging the reproducer stylus from the record surface. Other objects of my invention will appear more fully in the following specification and appended claims.

In order that my invention may be more clearly understood, attention is hereby directed to the accompanying drawing forming a part of this specification, and in which—

Figure 1 represents a view partly in elevation and partly in section showing the preferred embodiment of my invention.

Figs. 2 and 3 represent views in perspective of parts of the device shown in Fig. 1; and

Fig. 4 represents a view partly in section and partly in elevation of a detail of construction.

In all of the views, like parts are designated by the same reference characters.

Referring to Fig. 1, the reproducer 1 is provided with a floating weight 2 which is connected to the body of the reproducer by a spring connection 3 permitting movement of the floating weight upwardly and downwardly with respect to the body of the reproducer. The floating weight carries a reproducer stylus 4 which may be supported by a lever connected to the diaphragm of the reproducer in the manner shown in U. S. patent to Thomas A. Edison No. 1,055,621. The stylus 4 is arranged to track a record 5 carried by the mandrel 6 which is rotatably supported upon a bed-plate 7,

the latter being carried by brackets 8 secured to the inside of the cabinet 9. A cover 10 is hinged, as shown at 11, to the body portion of the cabinet. The mandrel 6 and the record carried thereby may be rotated by a motor shown at 12. The reproducer is carried in a horizontal position in the traveling carriage 14 which is pivoted at one end to a rod 15 extending throughout the length of the mandrel 6. The other end of the carriage 14 rests upon a straight edge 16. The motor has connected thereto a rotatable feed screw 17 (see Figs. 1 and 2) which is engaged by a half nut 18 connected to the traveling carriage in the manner to be more fully described. The end of the traveling carriage which is pivoted to the rod 15 has a substantially vertical portion 19 against the inner surface of which a member 20 is slidably mounted by means of headed screws 21 which are secured to the said portion 19 and pass through elongated slots 22 in the member 20. The lower portion of the slide 20 is formed with a rearwardly extending tongue 23 to which the feed nut 18 is connected, as by a flat spring 24. The upper portion of the slide 20 is formed with a rearwardly extending tongue 25 in which is threaded a screw 26 arranged to engage the under side of the floating weight 2 when the reproducer stylus is disengaged from the record. A spring 27 secured to the tongue 23 bears on the under side of the part 19 and tends to hold the slide 20 in its lowermost position. For elevating the slide, I preferably provide a member 28 rotatably mounted in a boss 29 extending from the portion 19 of the traveling carriage, the member 28 being formed with a handle or finger-piece 30 arranged at an angle to the body portion thereof for rotating the same. The rear or inner end of the member 28 is provided with a pin or projection 31, the axis of which is parallel to but eccentric with respect to the axis of the member 28. The pin 31 is arranged within a horizontal slot 32 formed on the slide 20 so that upon rotation of the member 28, the slide is elevated or depressed, depending upon the direction of rotation of the member 28. A screw 33 mounted in the boss 29 and having its inner end arranged within an annular groove 34 in the part 28 holds the latter against longitudinal movement in

the said boss. The vertical movement of the slide 20 is limited by the engagement of the screws 21 with the ends of the slots 22.

When the slide 20 is in its lowermost position, as shown in Fig. 2, the feed nut 18 is in engagement with the feed screw 17, and the screw 26 is below and out of engagement with the floating weight 2, the stylus 4 resting upon the surface of the record 5. With the parts in this position, the rotation of the feed screw causes the traveling carriage to move along the rod 15 and the straight edge 16, the reproducer moving rectilinearly in a horizontal plane to cause the stylus to traverse the record. When it is desired to stop the feeding movement of the reproducer longitudinally of the record and to disengage the stylus 4 from the record surface, the member 30 is rotated so as to cause the elevation of the slide 20. This elevation of the slide causes a disengagement of the nut 18 from the screw 17 and also causes the screw 26 to engage the under side of the floating weight and to elevate the same and lift the stylus out of engagement with the record. The carriage 14 and the members carried thereby can now be moved by hand along the record to any desired position. The parts may again be brought back into operative position, as shown in Fig. 2, by turning the part 30 in the proper direction for lowering the slide 20.

The sound conveyer employed by me is preferably entirely free from flexible joints. It is provided at its smaller end with a substantially horizontally extending portion 35 which is rotatably mounted upon the horizontal neck 36 of the reproducer (see Fig. 4). As shown in said figure, the reproducer neck is provided with oil grooves 37, the oil in the said grooves serving both to lubricate the joint between the sound conveyer and the reproducer neck and to form an air-tight joint between said parts. The sound conveyer extends from the portion 35, the axis of which is above the record support and the motor, downwardly past the record support and motor in a substantially vertical direction, as shown at 36', and terminates in a substantially horizontal portion 37' passing under the motor. The mouth of the amplifier is arranged opposite an opening 38 in the front wall of the cabinet. When the cover 10 is closed, as shown in Fig. 1, all of the phonographic mechanism is inclosed within the cabinet. Secured to the bottom of the cabinet adjacent the large or exit end of the sound conveyer is a bracket 39 which is provided with a vertically extending portion 40 having formed therein a straight vertical slot 41 through which passes a horizontal pivot pin 42 which is secured within the horn at the bottom of the outer end thereof. The pivot 42 carries adjacent the outer end thereof a washer 43

which bears against the outside of the portion 40 of the bracket and is held in place on the said pivot by a nut 44. During the travel of the reproducer and the stylus carried thereby across the record surface, the outer or exit portion of the horn is constrained by the pivot 42 and the portion 40 of the bracket 39 to remain in a position substantially opposite the opening 38 in the cabinet. During the said movement of the reproducer, the horn or sound conveyer moves laterally about the horizontal axis of the pivot 42, and inasmuch as the portion 35 of the horn always remains in the same horizontal plane, the pivot 42 and the portion of the horn to which the same is connected also move bodily upwardly and downwardly in the direction of the vertical slot 41. A tension spring 45 arranged above the center of gravity of the horn and secured to the bed-plate 7 and to the part 37' supports a part of the weight of the horn and facilitates the free movement thereof.

The construction described herein for controlling the mechanical feeding means to render the same operative or inoperative, and for controlling the movement of the reproducer stylus to and from operative position with reference to the record surface is made the subject matter of and claimed in my copending application Serial No. 223,899, filed March 22, 1918, and entitled phonographs, which is a division of the present application.

While I have shown the preferred form of my invention, it is to be understood that I am not limited to the particular details shown and described.

Having now described my invention, what I claim as new and desire to protect by Letters Patent is as follows:—

1. In a phonograph or talking machine, the combination of a record support, a reproducer movable substantially in a given plane to reproduce a record carried by said support, and a sound conveyer connected with said reproducer and having an exit portion movable at an angle to said plane during the movement of said reproducer in said plane, substantially as described.

2. In a phonograph or talking machine, the combination of a record support, a reproducer movable horizontally to reproduce a record carried by said support, and a sound conveyer connected with said reproducer and having an exit portion movable vertically during the horizontal movement of the reproducer, substantially as described.

3. In a phonograph or talking machine, the combination of a record support, a reproducer adapted to travel across a record carried by said support, and a sound conveyer connected with said reproducer and formed with an exit portion having a motion of translation and rotation during the

movement of the reproducer across the record, substantially as described.

4. In a phonograph or talking machine, the combination of a record support, a reproducer movable substantially in a given plane across a record carried by said support, and a sound conveyer connected with said reproducer and provided with an exit portion having a pivotal movement about an axis substantially parallel to said plane and a translatable movement at an angle to said plane, substantially as described.

5. In a phonograph or talking machine, the combination of a record support, a reproducer movable horizontally to traverse a record carried by said support, and a sound conveyer connected with said reproducer and provided with an exit portion having a pivotal movement about a horizontal axis and a vertical translatable movement, substantially as described.

6. In a phonograph or talking machine, the combination of a reproducer mounted for movement in a straight line, and a sound conveyer connected with said reproducer and having an exit portion mounted for translatable movement transversely to said straight line during the movement of said reproducer in said straight line, substantially as described.

7. In a phonograph or talking machine, the combination of a reproducer mounted

for movement in a substantially straight line, and a sound conveyer connected with said reproducer and having an exit portion mounted for combined pivotal and rectilinear movement during the movement of said reproducer in said straight line, substantially as described.

8. In a phonograph or talking machine, the combination of a reproducer movable horizontally in a substantially straight line, and a sound conveyer connected with said reproducer and having an exit portion movable bodily in a vertical direction, and also pivotally about a substantially horizontal axis, substantially as described.

9. In a phonograph or talking machine, the combination of a cabinet having an opening therein, a record support, a reproducer adapted to travel across a record carried by said support, and a sound conveyer connected with said reproducer and formed with an exit portion opposite said opening and having a motion of translation and rotation during the movement of the reproducer across the record, substantially as described.

This specification signed and witnessed this 19th day of June, 1915.

JOHN P. CONSTABLE.

Witnesses:

WILLIAM A. HARDY,
FREDERICK BACHMANN.



MACHINE FOR CONTINUOUS REPRODUCTION OF
PHONOGRAPHIC COMPOSITIONS.

1,265,286 ----- C.S. Andre & W. T. Jones,
Filed July 28, 1915,
Patented May 7, 1918.

C. S. ANDRES & W. T. JONES.
 MACHINE FOR CONTINUOUS REPRODUCTION OF PHONOGRAPHIC COMPOSITIONS.
 APPLICATION FILED JULY 28, 1915.

1,265,286.

Patented May 7, 1918.
 3 SHEETS—SHEET 1.

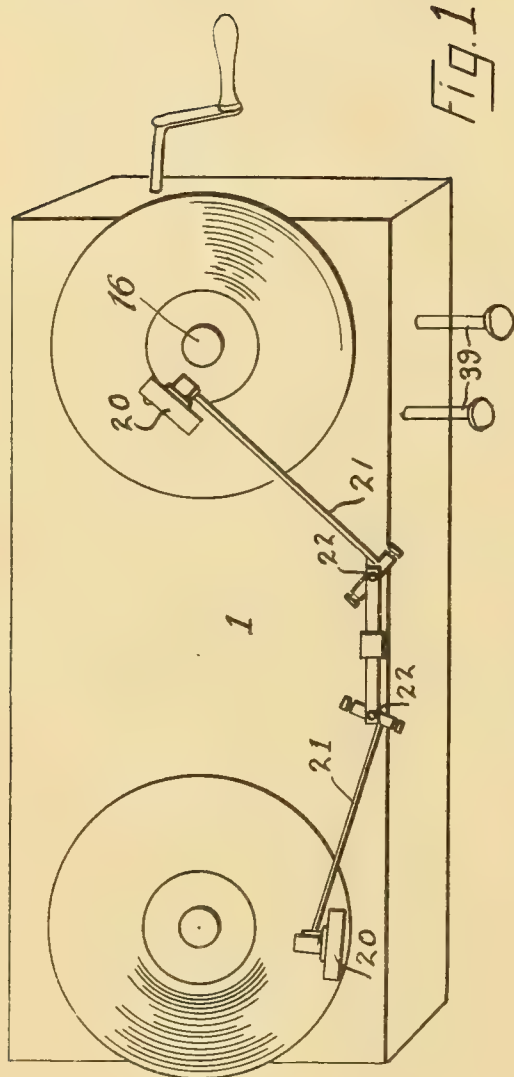


FIG. 1

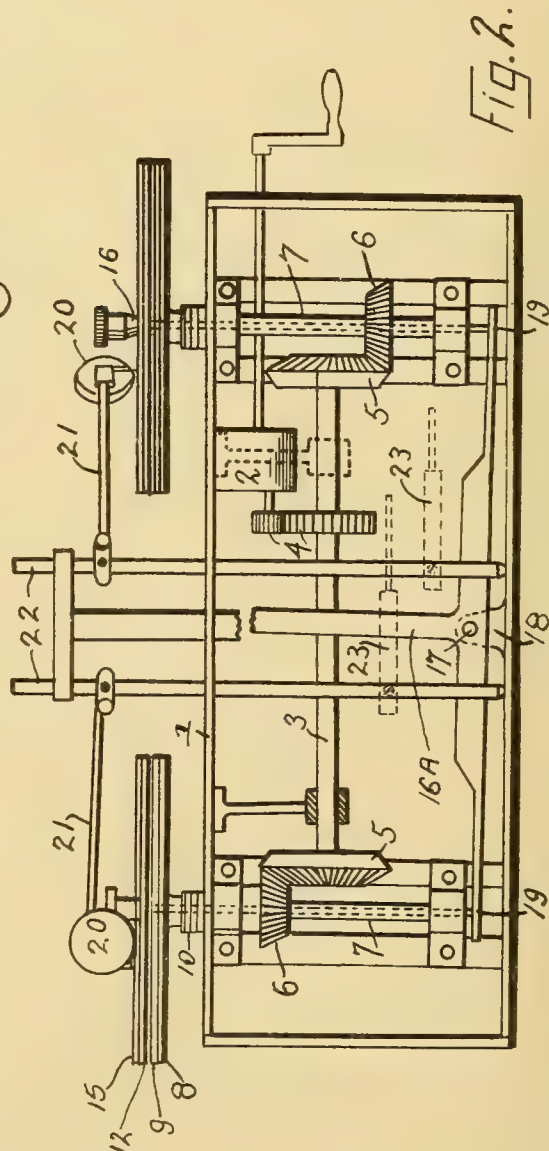


FIG. 2.

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 Attorney

C. S. ANDRES & W. T. JONES.
MACHINE FOR CONTINUOUS REPRODUCTION OF PHONOGRAPHIC COMPOSITIONS.
APPLICATION FILED JULY 28, 1915.

1,265,286.

Patented May 7, 1918.

3 SHEETS—SHEET 2.

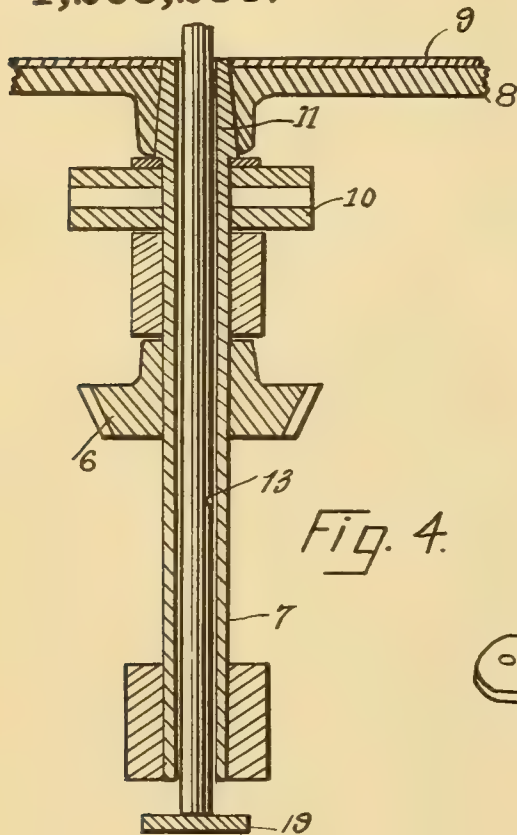


Fig. 4.

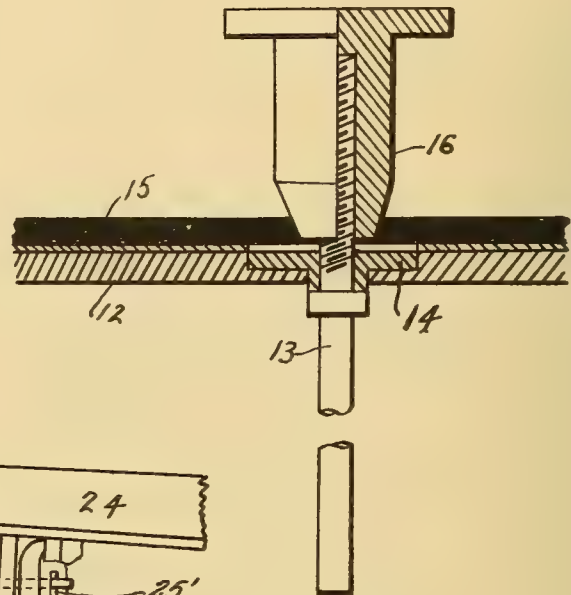


Fig. 3.

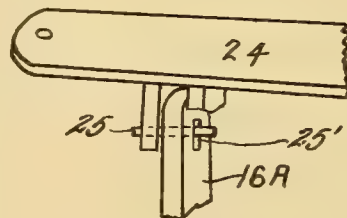


Fig. 6.

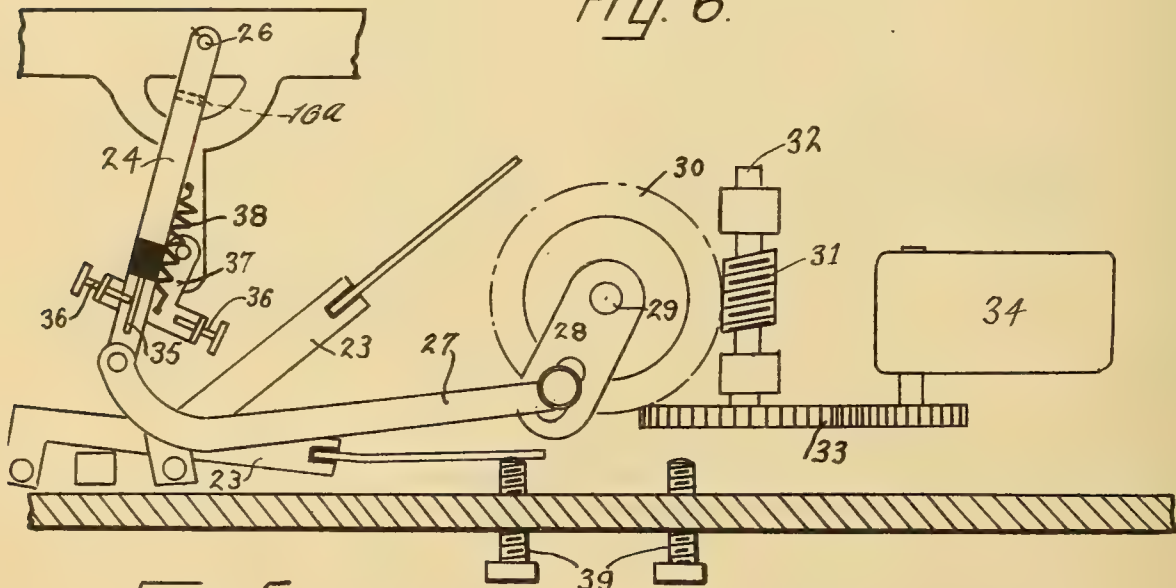


Fig. 5.

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C. S. ANDRES & W. T. JONES.
 MACHINE FOR CONTINUOUS REPRODUCTION OF PHONOGRAPHIC COMPOSITIONS.
 APPLICATION FILED JULY 28, 1915.

1,265,286.

Patented May 7, 1918.

3 SHEETS—SHEET 3.

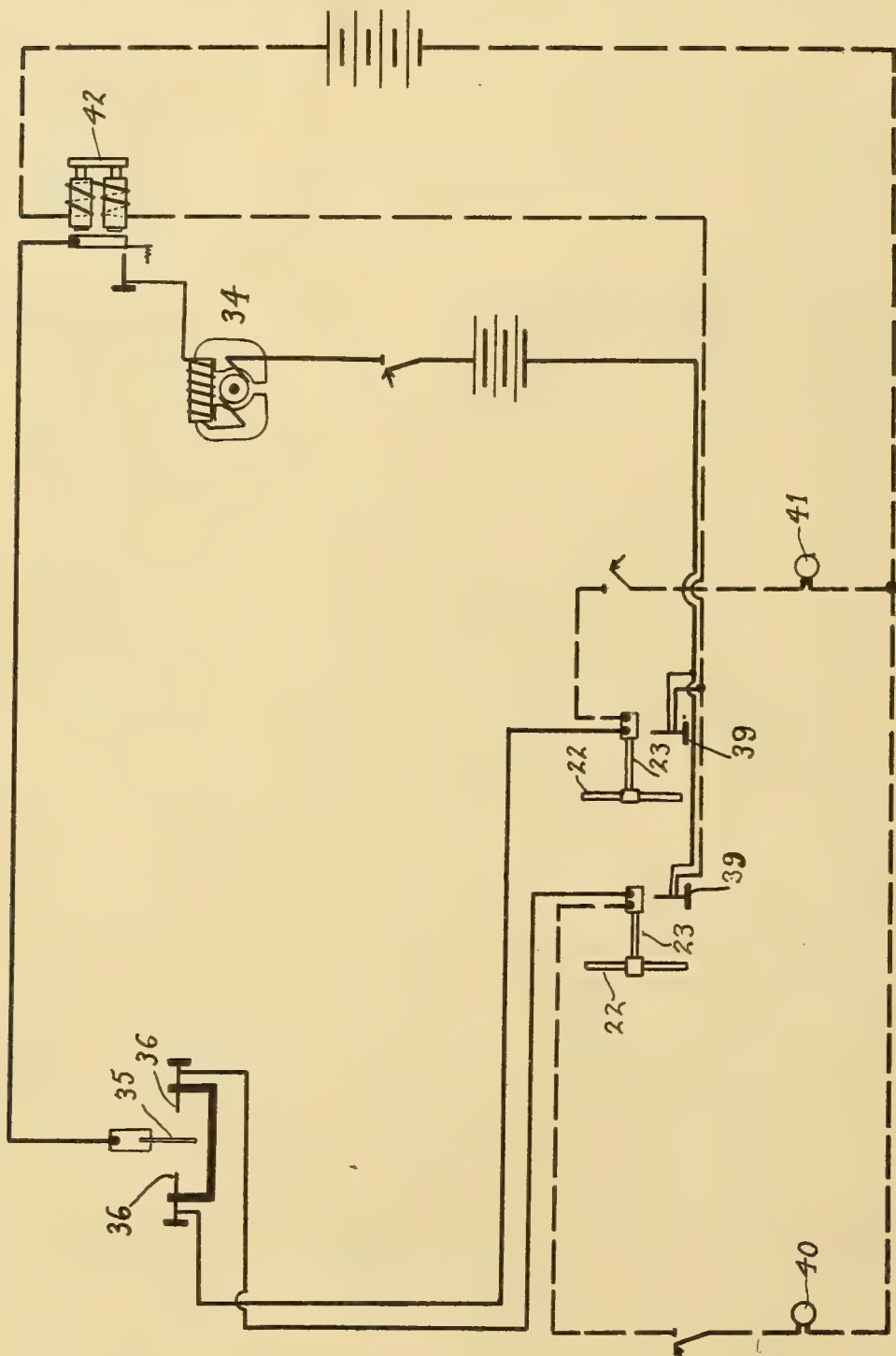


Fig. 7

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 W. T. Jones.

Inventors

By

Joel N. Morris

Attorney

UNITED STATES PATENT OFFICE.

CHARLES S. ANDRES AND WILLIAM T. JONES, OF PHILADELPHIA, PENNSYLVANIA,
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MACHINE FOR CONTINUOUS REPRODUCTION OF PHONOGRAPHIC COMPOSITIONS.

1,265,286.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed July 28, 1915. Serial No. 42,239.

To all whom it may concern:

Be it known that we, CHARLES S. ANDRES and WILLIAM T. JONES, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Machines for Continuous Reproduction of Phonographic Compositions, of which the following is a specification.

This invention relates to a machine in which means are provided whereby the continuous reproduction of speech or music recorded on phonographic disks may be obtained.

The object of this invention is to provide means whereby a number of phonographic disks may be played or operated one after the other without stopping the machine to change the disks, and to provide controlling means whereby a second disk is brought into operation successively with a former disk when the latter has reached the end of the subject matter recorded thereon, thereby causing a continuity of the sound or speech.

In the accompanying drawings, similar reference characters refer to similar parts throughout the drawings.

Figure 1 is a view in perspective of a machine embodying this invention. Fig. 2 is an elevation showing the mechanism employed to operate the turn-tables and the mechanism connected with the reproducer. Fig. 3 is an elevation, partly in section, of a fastening-nut to center the disk on the false-turntable, and spindle for the latter. Fig. 4 is a vertical sectional view of a hollow shaft, turn-table and attaching means for the latter. Fig. 5 is a detail showing the mechanism for operating the bell-crank lever. Fig. 6 is a detail showing the means for connecting the bell-crank and the lever for operating the same. Fig. 7 is a diagrammatic view of a motor operating circuit, shown in full lines, and a test-lamp circuit, the latter being shown in dotted lines, as contemplated in this invention.

In the drawings the numeral 1 designates a cabinet or box for the device and its framework and operating parts. The parts of the

machine may be classified into several sections according to the functions which each section is intended to produce in the device. Thus one section is for operating the disks or reproducing parts of the device, another for placing the disks in and out of operation, another for timing or adjusting the action of said parts, and another electrically arranging the motive or other parts according to their sequence of action.

The section for operating and timing the disk elements consists of a suitable motor 2, connected with a main shaft 3 by means of gearing 4, the shaft being journaled and held suitably in place and provided with bevel gears 5 adjacent to its ends. The gears 5 engage with bevel gears 6 mounted on hollow shafts 7 which are held and journaled in place. The general construction of the hollow shafts is indicated in Fig. 4. They are arranged to hold and rotate with them main plates or turn-tables 8 on each of which is secured felt covering 9. These main turn-tables are rotatable on friction reducing means 10 which may be of any approved form of construction in general use, and they are provided with conical borings to enable them to be placed on the conical heads 11 of the hollow shafts. Thus the turning of the motor 2 operates and rotates the turn-tables 8, the direction of turning being consistent with the gearing connection.

Secured to a false turn-table 12, one of which is mounted over each turn-table 8, is a spindle shaft 13 which is normally disposed in the hollow shaft 7 and projects beyond the lower end of the same as is apparent in the drawings. This plate is connected to the spindle by a suitable coupling means 14 and it is also covered with felt arranged to take and frictionally hold a phonographic record or disk 15. The disk end of the spindle is threaded to receive a disk-centering fastening-nut 16, the centering arrangement being provided for by conically forming the contacting end of the said nut. This nut serves to also hold the disk 15 in place on the false-turn-table. The lowering and contacting of the false turn-table with the felt covering 9 serves to cause a frictional

engagement between the two, and if the latter with its turn-table 8 is rotating, it will cause the false turn-table 12 and disk 15 to rotate also. It will be noted that the spindle may be readily reciprocated up and down in the hollow shaft 7.

The spindles are raised by means of a bell-crank lever 16^A which is pivoted at 17 to a support 18, the ends 19 being arranged to come under the hollow shafts and make contact with the projecting ends of the spindles. In this case gravity causes the spindles to make positive contact with the lever end portions, but it is understood that other principles may be used for the same purpose. The pendulum movement of the bell-crank causes one spindle to rise together with its false turn-table and disk, while another spindle is lowered and its false turn-table lowered onto the turn-table 8 so as to be operated thereby. Thus one false turn-table is revolving while the other has stopped in alternate sequence.

Suitable reproducing mechanism 20 is provided for each disk and is supported by an arm 21 which is adjustably attached to a post 22 vertically supported in the framework by a T shaped support 22^A and arranged for rotation as the functions of the reproducer require. These posts extend through the cabinet and are provided with electrical contact making means 23 which are adjustably secured thereon. The bell-crank 16^A is actuated by means of a lever 24 to which it is connected by means of a pin and slot arrangement 25 as shown in Fig. 6. This lever is pivoted at 26 and is operated through a connecting link 27, a crank 28, a shaft 29, a worm-gear 30, a worm 31, shaft 32, gearing 33 and electric motor 34. The lever 24 is provided with an electrical contact blade 35 which connects up a circuit (see Fig. 7) when it makes contact with the points or screws 36. These screws are on a separate holder 37 which is of T shape and has a quick oscillating action produced by means of a spring 38. The making of the contact of the blade 35 with either screw 36, and one of the contact devices or arms 23 with one of the adjustable screws 39 completes a motor circuit which operates the motor 34 and its connecting transmission parts so that the motor will cause the crank 28 to pull the arm 27 and lever 24 to a position that will reverse the connection made by the blade 35. This action will open the circuit and leave it open until the other contact arm 23 makes contact with its respective screw 39. This circuit may be traced out in Fig. 7.

Pilot lamps 40 and 41 are provided for the purpose of testing out the contact positions of the arms 23 and are operated by a current supplied from battery cells as shown

in Fig. 7 of the drawings. A relay magnet 42 is inserted in said lamp circuit to prevent the inrush of the higher current which operates the shifting motor from burning out the pilot lamps. Preparatory to the placing of the succeeding phonographic record while one is being played, the moment that the arm for the former record comes into contact with its contact screw the light for that particular record will glow when the push button or switch in that circuit is operated. At the same time the magnet will be energized which will break for the time being the shift motor circuit. Upon release of the button or the removal of the arm from the contact screw the magnet will be released from operation and the shift motor circuit restored and will be ready for operation when the proper moment arrives.

The operation of the device is as follows: The motor 2 starts the turn-tables 8 rotating and one of the false turn-tables which is in contact with the former. The disk on the false turn-table is thereby rotated and the reproducer with its needle is brought to a more central position with respect to the disk. The movement of the reproducer in turn moves the arm 21 and rotates the respective post 22 which in turn brings the contact arm 23 into circuit contact with the adjacent contact screw 39 which enables the current to flow along the blade 35 to 36 with which the latter is in contact, which causes the motor 34 to operate. The operation of the motor causes the lever 24 which is pivoted at 26 to move in the arc of a circle. The upper end of the bell-crank being pivoted to the lever 24 the former is turned on its pivotal point 17 so as to reverse the position of the bell-crank 16^A and to cause it to lower one of the spindles, the one which has just been out of contact with its revolving turn-table, and to raise out of contact the false turn-table which has just been in operation. This shifting of the bell-crank and false turn-tables is arranged to take place just at the time when the subject matter to be reproduced on the first disk has been finished by a suitable adjustment of the contact arm 23 secured to the same post which carries the reproducer arm coöperating with said disk. While the second disk is being reproduced the operator may remove the first disk which has just been rendered and replace it with another and return the reproducer to the starting point.

The phonographic records are provided with indicating points at which the subject matter thereon begins and ends. In preparing the succeeding record while one is being operated the contact screw for the former is withdrawn, by turning it out, from contact with the arm for that record, the reproducer is placed on the stopping

point for said record and the contact screw turned in until it comes into contact again with said arm at which time the pilot lamp for that record will glow on operation of the bush button in that circuit. By this means the positive position for shifting of the record is determined. The reproducer is then moved over to the starting point for the new record and the latter is ready for operation when the end of the operating record is reached.

Having described our invention, what we claim is:

1. A device of the class described comprising in combination, a phonographic mechanism having and operating a plurality of turn-tables, false disk plates for the turn-tables, means for making said false disk plates come consecutively into operative frictional contact with their respective turn-tables and be rotated by the latter, reproducing means, means carried by the last mentioned means for electrically connecting the first named means into circuit whereby the latter will take up its cycle of operation.

2. A device of the class described comprising in combination, a phonographic mechanism having and operating a plurality of turn-tables, false disk plates for the turn-tables, means for making said false disk plates to come consecutively into operative contact with their respective turn-tables and be frictionally rotated by the same, reproducer supporting means, a circuit closer carried by the last mentioned means and operative with the phonographic mechanism for electrically connecting the first named means into circuit whereby the latter will take up its cycle of operation.

3. A device of the class described comprising in combination, a phonographic mechanism having and operating a plurality of turn-tables simultaneously, false disk plates for the turn-tables adapted to make complete surface contact and substantial frictional engagement therewith, means for making the said false disk plates to come consecutively into operative connection with their respective turn-tables, and a fastening member contacting with false disk-plates and engaging the opening in the phonographic disk whereby the latter is secured on the disk-plates in a definite central relation when making said contact.

4. A device of the class described comprising in combination, a frame-work, a motor on the frame-work, mechanism operated by the motor, a plurality of turn-tables operated by the mechanism, a plurality of false disk plates reciprocable from operative contact with the turn-tables, disk centering and fastening means on the false disk plates, reproducers arranged adjacent to the false disk plates and in contact with

phonographic disks thereon, means for reciprocating the false disk plates alternately, motor means for the last mentioned means, and means for connecting the reciprocating means consecutively to the motor means.

5. A device of the class described comprising in combination, a frame-work, mechanism on the frame-work, a motor for operating the mechanism, a plurality of turn-tables operated by the mechanism, a plurality of disk-plates disposed over the turn-tables and adapted to be reciprocated in and from frictional contact with the latter, reproducers arranged adjacent to the disk-plates and in contact with phonographic disks thereon, means for reciprocating the disk-plates, motor means for the last named means, means for supporting the reproducers and circuit closers adjustably secured on the last mentioned means whereby the motor means for reciprocating the disk-plates are operable when the reproducers have reached a predetermined position on the disk records.

6. A device of the class described comprising in combination, a plurality of turn-tables, mechanism for rotating the turn-tables in unison, disk-plates for supporting phonographic records disposed over said turn-tables and reciprocable from operative contact therewith, a bell-crank lever adapted to reciprocate said disk-plates, means for actuating the bell-crank, reproducer supporting means, and circuit closers adjustably secured on the last named means whereby the means for actuating the bell-crank lever is operable at predetermined intervals.

7. A device of the class described comprising in combination, a plurality of turn-tables, mechanism for rotating the turn-tables in unison, disk-plates for supporting phonographic records disposed over said turn-tables and reciprocable from operative contact therewith, a bell-crank lever adapted to place the disk-plates in and out of contact with the turn-tables, means for actuating the bell-crank lever, a circuit closer disposed on the last named means, reproducer supporting means, and circuit closers adjustably secured on the reproducer supporting means operable with the first named circuit closer whereby the bell-crank actuating means is operated when the reproducer supporting means have reached a predetermined position with respect to the phonographic records.

8. A device of the class described comprising in combination, a plurality of turn-tables, mechanism for rotating the turn-tables in unison, disk-plates adapted for supporting phonographic records disposed over the turn-tables and having spindles, reproducer supporting means, a bell-crank lever adapted to engage with the ends of the

spindles, means for actuating the bell-crank lever, consisting of an arm pivotally secured to the bell-crank, a link, a crank, a shaft and a motor, and circuit closers secured on
5 the reproducer supporting means whereby the bell-crank motor is operated at intervals and the disk-plates are alternately brought

in and out of engagement with their respective turn-tables.

CHARLES S. ANDRES.
W. T. JONES.

Witnesses:

A. A. JONES,
O. Y. SESSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH.

1,265,295 ----- L. Bonsieur,
Filed Sept. 21, 1916,
Patented May 7, 1918.

L. BONSIER.
 PHONOGRAPH.
 APPLICATION FILED SEPT. 21, 1916.

1,265,295.

Patented May 7, 1918.

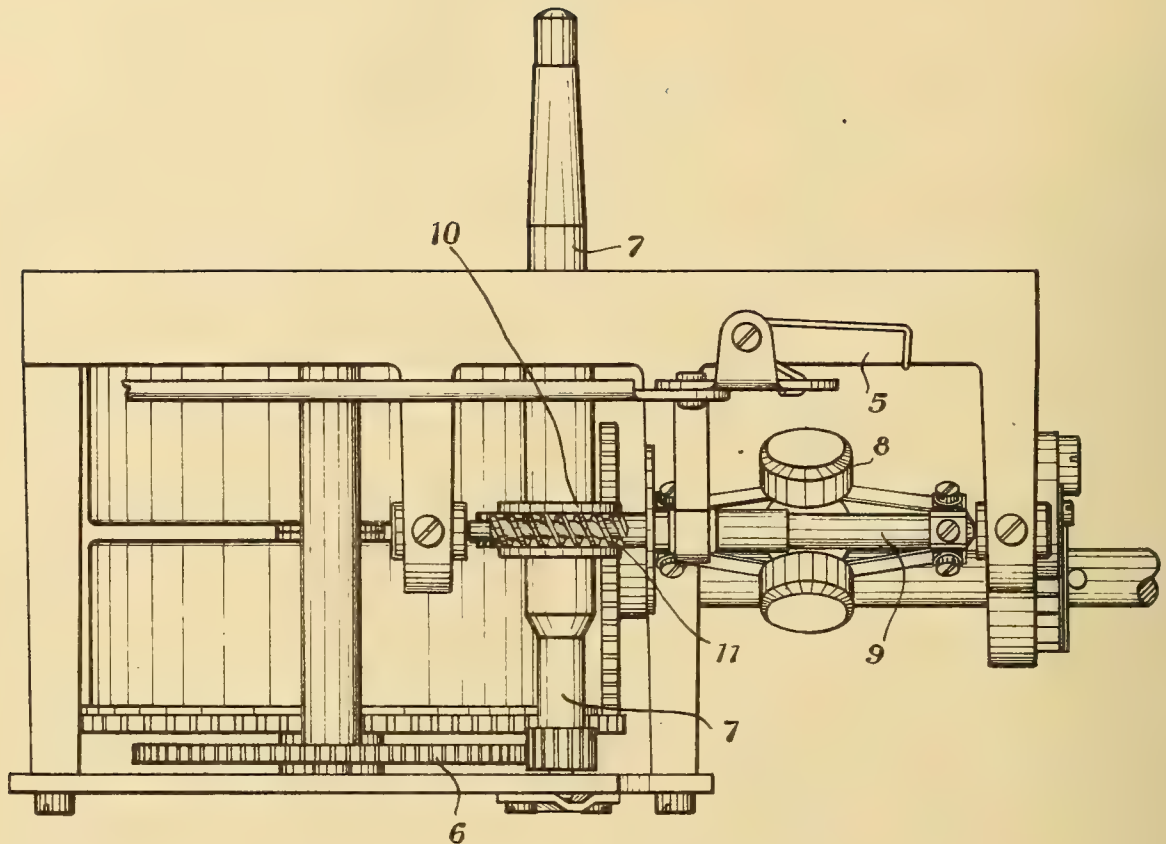


Fig-1

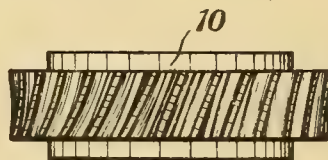


Fig-2

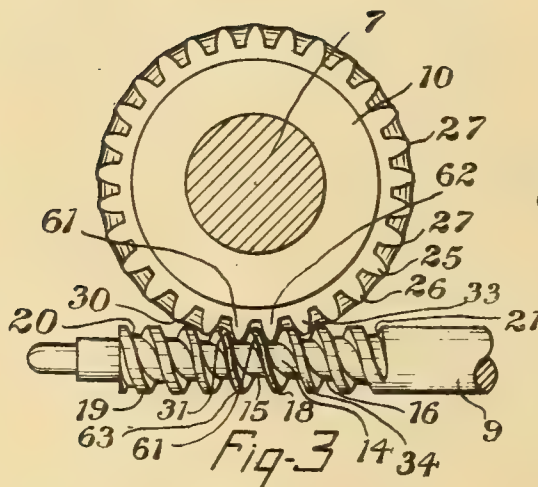


Fig-3

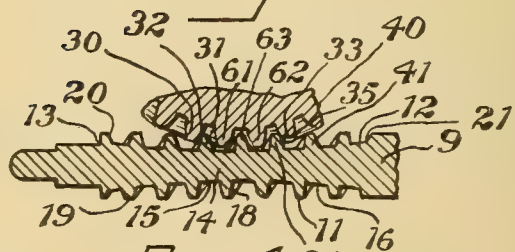


Fig-4

Inventor.
 Le Bonsieur
 By J. O. Richey
 His Attorney

UNITED STATES PATENT OFFICE.

LE BONSIIEUR, OF ELYRIA, OHIO, ASSIGNOR TO THE GARFORD MANUFACTURING COMPANY, OF ELYRIA, OHIO, A CORPORATION OF OHIO.

PHONOGRAPH.

1,265,295.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed September 21, 1916. Serial No. 121,362.

To all whom it may concern:

Be it known that I, LE BONSIIEUR, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Phonographs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in motors and more particularly to the elimination of foreign sounds and noises during the operation of the machine, to the cheapening and simplifying of the construction thereof and to the elimination of play or back-lash between the parts.

These and other objects of my invention and the invention itself will, I believe, be clear from a description of the embodiment of the invention.

Figure 1 is a view of a motor incorporating my invention.

Figs. 2, 3 and 4 are detail views of the mechanism employed.

Referring now to the drawing, at 5 is shown the frame of a phonograph motor, and at 6 a motor, here illustrated as a spring motor for driving the turn-table shaft 7 of the phonograph. A record disk support, not shown, is mounted upon this shaft and is rotated with the record. The governors, here shown as ball governors, are illustrated at 8. The governor shaft is shown at 9. A worm gear wheel is shown at 10 on the shaft 7, and a worm is shown at 11 upon the shaft 9. The worm convolutions increase in height and the valleys between the adjacent convolutions of the worm increase in depth from the ends 12 and 13 of the worm to the center 14 thereof. For example, the valley 15 is deeper than the valley 16, and the convolution at 18 is higher than the convolution at 19. To get the best results, these depths and heights increase respectively from the end to the center in a direct ratio, preferably so that the line 20—21 defining the bottom of the valleys between the convolutions is an arc of a circle, here shown as of greater radius than the radius of the worm wheel 10. The teeth 25 of the worm wheel are tapered off, as shown at 26 and the ends 27 are preferably cut upon the arc of a circle

In my invention, as will be seen in Fig. 4, two teeth of the worm wheel engage the worm at the same time, and these teeth are spaced apart, and so bind the parts together that there will be no play or back-lash between the shafts 7 and 9. In the embodiment shown, there will be two unengaged or idle teeth intermediate the two engaged or busy teeth on the wheel, and one idle or unengaged convolution on the worm between the busy or engaged convolutions. The idle teeth on the wheel are shown at 61 and 62 and the idle worm convolution at 63.

Referring now to Fig. 4, it will be seen that the tooth 30 engages the convolution 31 at the point 32, and at the same time the tooth 33 engages the convolution 34 at the point 35. As the tooth 40 of the worm wheel engages the convolution 41, the tooth 61 will engage the convolution 63 and so on, as the wheel 10 revolves, maintaining throughout the operation the engagement exemplified by the position of the parts in Fig. 4. As a result of this two-point engagement between the wedge surfaces of the parts, the wheel 10 will have no movement independent of the worm shaft, so that the parts will at all times be held together, preventing any play or back-lash and at the same time facilitating the operation of the device. As will be seen, there will be surface engagement between the teeth and convolution, which will be made and broken by sliding contact. There will be no striking of the tops of the teeth against the bottom of the valleys, and owing to the sliding, progressive and easy engagement and disengagement of the teeth, the operation will be practically noiseless.

Moreover, in the use of standard hobbing machines, it will be easier and cheaper to cut the form of worm employed in my invention than the old forms of worms, since a circular hobbing device may be employed. Thus, I have not only produced a motor which is more efficient in operation, but have also cheapened the construction thereof.

While I have shown and described my invention as used between the record support shaft and the governor shaft, it will be understood that it may be employed between other shafts where there is back-play or noise in the operation.

I have shown this particular embodiment and these particular details for the purpose

of explaining my invention, and not that I wish to be limited thereto, for it will be obvious to those skilled in the art that numerous and extensive departures may be made from the form and details shown, without departing from the spirit of the invention.

I claim:—

1. In a phonograph, the combination of a motor, a record support shaft, governors for the motor and a governor shaft, a worm on the governor shaft provided with convolutions and valleys between the convolutions, the valleys increasing progressively in depth from the end to the center of the worm and the convolutions increasing in height progressively in the same ratio as the valleys increase in depth from the ends to the center of the worm, the core of the worm being thinner at the center than at the ends, and a worm wheel on the record support shaft having teeth meshing with convolutions of the worm.

2. In a phonograph, the combination of a motor, a record support shaft and means through which the motor drives the shaft, a governor and a governor shaft, a worm on the governor shaft provided with convolutions increasing in height from the ends to the center of the worm, the valleys from the ends to the center increasing in depth from the ends to the center of the worm, and a worm wheel on said record support shaft having a plurality of teeth, two of which engage the worm simultaneously.

3. In a phonograph, the combination of a motor, a record support shaft and means through which the motor drives the record support shaft, governors for the motor and a governor shaft, a worm on the governor shaft provided with convolutions and valleys between the convolutions, the valleys increasing in depth from the end to the center of the worm and the convolutions increasing in height from the ends to the center of the worm, the core of the worm being thinner at the center than at the ends and a worm wheel on the record support shaft provided with a plurality of teeth, two of which engage convolutions of the worm simultaneously, there being one worm convolution between the convolutions of the worm engaged by the teeth of the worm wheel and there being two idle teeth between the busy teeth of the worm wheel.

4. In a phonograph, the combination of a motor, a record support shaft and means through which the motor drives said shaft, governors for the motor and a governor shaft provided with a worm, a worm wheel on said record support shaft provided with teeth adapted to engage the convolutions on the worm shaft, two of the teeth engaging the worm simultaneously, there being two idle teeth on the worm wheel intermediate the busy teeth thereon, there being one idle

convolution of the worm between the busy convolutions thereof during the operation of the machine.

5. In a phonograph, the combination of a motor, a record support shaft and means through which the motor drives said shaft, governors for the motor and a governor shaft provided with a worm having convolutions thereon, the valleys of the convolutions increasing in depth from each end to the center of the worm, the bottoms of the valleys being arc-shaped and each on a line continuous with the arc of a circle drawn through the bottom of each of the valleys, a worm wheel on the record support shaft adapted to coöperate with the worm to drive the governors, two non-adjacent teeth of the worm wheel engaging simultaneously two non-adjacent convolutions of the worm all during the operation of the worm.

6. In a phonograph, the combination of a motor, a record support shaft and means through which the motor drives the record support shaft, governors for the motor and a governor shaft, a worm on the governor shaft provided with convolutions and valleys between the convolutions, the valleys increasing in depth from the end to the center of the worm and the convolutions increasing in height from the ends to the center of the worm, the core of the worm being thinner at the center than at the ends, and a worm wheel on the record support shaft provided with a plurality of teeth, two of which make sliding contact with convolutions of the worm, said teeth having surface engagement with said convolutions simultaneously, there being one worm convolution between the engaged convolutions of the worm and two teeth on the worm wheel between the engaged teeth.

7. In a phonograph, the combination of a motor, a record support shaft, governors for the motor and a governor shaft, a worm on the governor shaft provided with convolutions, and valleys between the convolutions, the valleys increasing progressively in depth from the ends to the center of the worm so that were a plane passed through the long axis of the shaft the line in said plane passing along and joining the bottoms of the valleys would be an arc of a circle, and the convolutions increasing correspondingly progressively in height from the ends to the center of the shaft, the tops of the convolutions being always equidistant from the long axis of the shaft, the core of the worm being thinner at the center than at the ends and a worm wheel on the record support shaft having teeth meshing with convolutions of the worm.

8. In a phonograph, the combination of a drive shaft and a driven shaft, a worm wheel on one of said shafts, and a worm on the other, said worm wheel being provided with

teeth adapted to make sliding contact with the convolutions on the worm when the parts are in operation, two of the teeth on the worm wheel making surface engagement
5 with two convolutions on the worm simultaneously, an idle tooth on the worm gear between the busy teeth and an idle convolution on the worm between the busy convolutions.

10 9. In a phonograph, the combination of a driven shaft and a drive shaft, a worm gear on one of said shafts and a worm on the other, a plurality of teeth engaging a plurality of convolutions on the worm simultaneously, idle teeth on the gear between the
15 busy teeth and an idle convolution on the worm between the busy convolutions.

10. In a phonograph, the combination of a

motor, a record support shaft, governors for the motor and a governor shaft, a worm on the governor shaft provided with convolutions, and valleys between the convolutions, the valleys increasing in depth from the end to the center of the worm and the convolutions increasing in height from the ends to the center of the worm, the core of the worm being thinner at the center than at the ends, and a worm wheel on the record support shaft having teeth meshing with convolutions of the worm. 20 25 30

In witness whereof, I have signed my name hereunto at Elyria, in the county of Lorain and State of Ohio, this 14 day of September, 1916.

LE BON SIEUR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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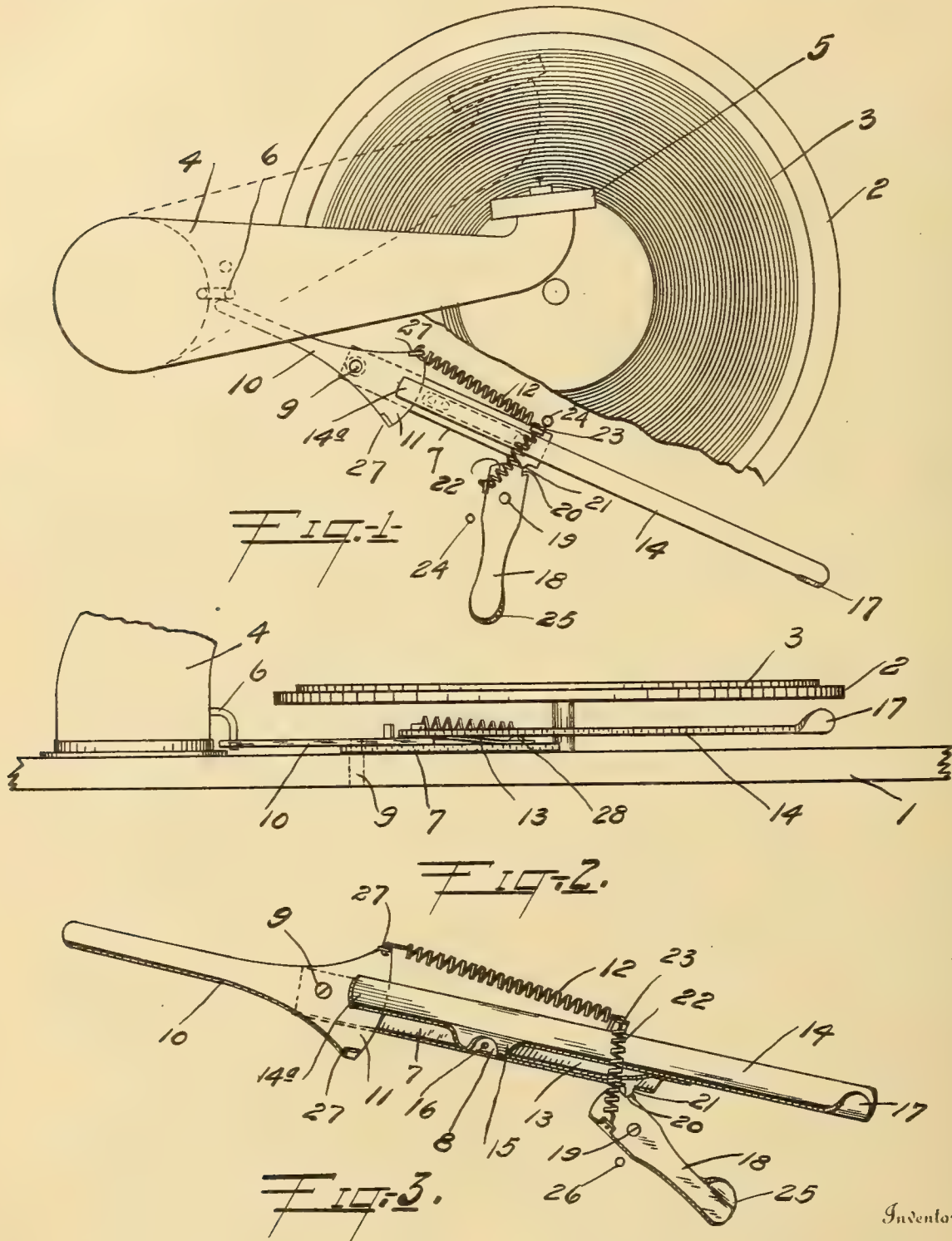
TALKING MACHINE STOP.

1,265,297 ----- C. J. Bousfield,
Filed Aug. 7, 1916,
Patented May 7, 1918.

C. J. BOUSFIELD.
TALKING MACHINE STOP.
APPLICATION FILED AUG. 7, 1916.

1,265,297.

Patented May 7, 1918.



Inventor

Charlie J. Bousfield

Edward R. Monroe.
Attorney

UNITED STATES PATENT OFFICE.

CHARLIE J. BOUSFIELD, OF BAY CITY, MICHIGAN, ASSIGNOR TO THE DELPHEON COMPANY, OF BAY CITY, MICHIGAN, A CORPORATION OF MICHIGAN.

TALKING-MACHINE STOP.

1,265,297.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed August 7, 1916. Serial No. 113,583.

To all whom it may concern:

Be it known that I, CHARLIE J. BOUSFIELD, a citizen of the United States of America, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Talking-Machine Stops, of which the following is a specification.

This invention relates to talking machine stops.

One object of my invention is to produce a positive and simple device which will automatically stop the talking machine mechanism at any point desired, during the travel of the tone arm across the sound record.

Another object resides in the provision of means under the control of the operator whereby the device may be set to stop the mechanism at any point during the travel of the tone arm across the sound record.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawing, and particularly pointed out in the appended claims, it being understood that changes may be made in form, size and minor details without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Figure 1 is a plan view of my device showing the mechanism out of operative engagement.

Fig. 2 is a side elevation of the same.

Fig. 3 is an isometric view showing a slight constructive difference over that shown in Fig. 1.

In the drawings, 1 is the top of a talking machine cabinet upon which is mounted a turntable 2 adapted to carry a sound record 3. A tone arm 4 is swingingly mounted on the casing 1 and carries at its outer end the sound box 5. All of these parts are of the ordinary type now in general use.

Extending outwardly and downwardly from the lower part of the tone arm 4 is a lug 6, for a purpose to be presently explained.

A plate 7 is pivoted to the casing at 9, and pivoted to said plate by the same pivot 9, is an operating lever 10 having an enlarged portion 11 at its inner end. Two upturned ears 27 are formed at adjacent sides of the enlarged portion 11 of the lever

10, which serve to limit the stroke of the lever 10. A helical spring 12 has one end attached to one ear 27 of the enlarged portion 11 of the lever 10, its other end being secured to an ear 23 formed at one side of the plate member 7. This spring has a tendency to normally throw the outer end of the lever 10 into engagement with the lug 6 of the tone arm 4. A flat spring 13 is attached at one end to the upper side of the plate 7 by means of a rivet 28 which is formed with a raised head. The opposite end of the spring 13 is bent up and secured to the under side of a lever 14, which tends to draw the inner end of the lever 14 downwardly upon the enlarged portion 11 of the lever 10. The raised head of the rivet 28 serves as a fulcrum upon which the lever 14 is adapted to be rocked.

The inner end of the lever 14 overlaps the enlarged portion 11 of the lever 10, as shown at 14^a and by reason of the spring 13 pulling downwardly on the under side of the inner end of the lever 14, the end 14^a is held in frictional contact with the said enlarged portion 11 of the lever 10. It will thus be obvious that the lever 10 will be held in any position to which it may be adjusted, by swinging the same on its pivot 9. At the outer end of the lever 14, an upturned thumb piece 17 is provided to facilitate the rocking of the lever 14 on the rivet 28.

A controlling or starting and stopping lever 18 is pivoted to the casing 1 at 19 and at its inner end, on one side of the pivot 19, is provided a receiving notch 20 for the reception of a lug 21 projecting from the edge of the plate 7. A spring 22 has one end attached to the inner end of the lever 18 on the opposite side of the pivot 19, and its other end attached to the lug 23 projecting from the opposite edge of the plate 7. The spring 22 normally has a tendency to pull the lever 18 to the left to the stopping position, but is held from doing this by the engagement of the lug 21 with the notch 20 when the parts are in operative position.

A stop 24 is attached to the casing for limiting the movement of the plate 7.

In the operation of my device the tone arm 4 is first moved to the point on the record at which it is desired to stop the operating mechanism and the travel of the tone arm, then by pressing down on the thumb rest 17, the end 14^a of the lever 14 is moved away

from engagement with the part 11 of the lever 10. The lever 10 is then moved by means of the spring 12 into engagement with the lug 6 of the tone arm 4 and upon release of the thumb rest 17, the lever 14 will, by means of the spring 13, be sprung to its normal position and the end 14^a of the lever 14 will frictionally hold the lever 10 in its adjusted position. The tone arm is then swung onto the first line of the sound record (as shown in dotted lines of Fig. 1) and the mechanism started by moving lever 18 to the right, whereby the lug 21 will be received in the notch 20 thereby holding said controlling lever 18 in its starting position against the tension of the spring 22. The tone arm will thus start moving across the record toward the center thereof. Upon the tone arm reaching the point at which it is desired to stop the mechanism, the lug 6 of the tone arm will engage the outer end of the lever 10 thus swinging the lever 10 and consequently the plate 7 and second lever 14 about the pivot 9 until the stop 24 prevents further movement. This releases the lug 21 from the notch 20 whereby the spring 22 will move the lever 18 to the left and stop the mechanism.

In Fig. 3 a slight modification of my device is illustrated. In this figure the plate 7 has a pair of upturned ears 8 at adjacent sides thereof, while the lever 14 has a similar pair of downwardly turned ears 15 which are adapted to fit between the upturned ears 8. The two pairs of ears are pivoted together by means of the pivot pin 16. A flat spring 13 is attached to the upper side of the plate 7, the free end of said spring being curved and then pressing upwardly against the outer end of the under side of the lever 14, thereby normally placing the opposite end 14^a of said lever 14 into frictional contact with the enlarged end 11 of the lever 10, thus holding said lever 10 in any position to which it may be adjusted. The rest of the elements in this figure are the same as those illustrated in Figs. 1 and 2.

What I claim is:

1. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to the plate, means on the tone arm for engaging said operating lever, said operating lever being adjustable to engage said means on the tone arm at any desired position of the tone arm during its travel and means on the plate for holding said operating lever in its adjusted position.
2. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to the plate and adjustable thereon, a third lever pivoted to the plate for holding said

operating lever in its adjusted position, and means carried by the tone arm for engaging the operating lever in any position of the tone arm during its travel.

3. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to the plate, means on the tone arm for engaging said operating lever, said operating lever being adjustable to engage said means on the tone arm at any desired position of the tone arm, means on the plate for engaging and holding said operating lever in its adjusted position, and means for pressing said holding means into contact with said operating lever.

4. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to the plate, means on the tone arm for engaging said operating lever, said operating lever being adjustable to engage said means on the tone arm at any desired position of the tone arm, means on the plate for engaging and holding said operating lever in its adjusted position, means for pressing said holding means into engagement with said operating lever, and means for throwing said holding means out of engagement with said operating means.

5. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to the plate, means on the tone arm for engaging said operating lever, said operating lever being adjustable to engage said means on the tone arm at any desired position of the tone arm, a third lever for engaging and holding said operating lever in its adjusted position, and a spring for holding said third lever into engagement with said operating lever.

6. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to the plate, means on the tone arm for engaging said operating lever, said operating lever being adjustable to engage said means on the tone arm at any desired position of the tone arm, a third lever pivoted to the said plate for engaging and holding said operating lever in its adjusted position, a spring for holding said third lever into engagement with said operating lever, and means formed integral with the third lever for throwing said holding means out of engagement with said operating lever.

7. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to

said plate, means on the tone arm for engaging said operating lever, said lever being adjustable to engage said means on the tone arm, and means for clamping said operating
 5 lever to the plate at any position to which the same may be adjusted.

8. In a stopping device for talking machines, a traveling tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an operating lever pivoted to
 10 said plate, means on the tone arm for engaging said operating lever, said lever being adjustable to engage said means on the tone arm at any desired position of the tone arm,
 15 means pivoted to the plate for clamping said operating lever to the plate at any position to which the same may be adjusted, and means for operating said clamping means.

9. In a stopping device for talking machines, a traveling tone arm, a lug on said
 20 arm, a controlling lever, a pivoted plate for operating said controlling lever, an adjustable operating lever pivoted to the plate and adapted to engage the lug on the tone arm,
 25 a third lever pivoted to the plate for clamping said operating lever in any adjusted position, a spring for pressing said third lever into engagement with the operating lever, and means formed integral with said
 30 third lever for operating the same.

10. In a stopping device for talking machines, a traveling tone arm, a lug on said
 tone arm, a controlling lever, a pivoted plate for operating said controlling lever, an ad-
 35 justable operating lever pivoted to the plate, a spring for throwing said operating lever

into contact with the lug on the tone arm, a third lever pivoted to the plate for holding
 said operating lever in its adjusted position, a spring for holding said third lever into
 40 engagement with said operating lever, and means for operating said third lever.

11. Stop mechanism for talking and other sound reproducing machines, comprising a
 member adapted to be set to be actuated by
 45 the tone arm at a predetermined point in its travel, a second member adjustable with reference to the first mentioned member and in coöperative relation thereto and adapted to engage the starting and stopping lever of
 50 the machine, and a third member mounted upon the said second member and adapted to engage the first mentioned member and hold it in the required adjusted position.

12. Stop mechanism for talking and other
 55 sound reproducing machines, comprising a member adapted to be set to be actuated by the tone arm at a predetermined point in its travel, a second member adjustable with reference to the first mentioned member and
 60 in coöperative relation thereto and adapted to engage the starting and stopping lever of the machine, a third member mounted upon the said second member and adapted to engage the first mentioned member, and spring con-
 65 necting means between the second and third members to cause the said third member to hold the first mentioned member in the desired position.

In testimony whereof I affix my signature. 70

CHARLIE J. BOUSFIELD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



WINDING MECHANISM FOR SPRING MOTORS.

1,265,473 ----- S.W. Meredith, L. Baumann, Sr., &
J. Black,

Filed Feb. 15, 1917;
Patented May 7, 1918.

S. W. MEREDITH, L. BAUMANN, SR. & J. BLACK.

WINDING MECHANISM FOR SPRING MOTORS.

APPLICATION FILED FEB. 15, 1917.

1,265,473.

Patented May 7, 1918.

3 SHEETS—SHEET 1

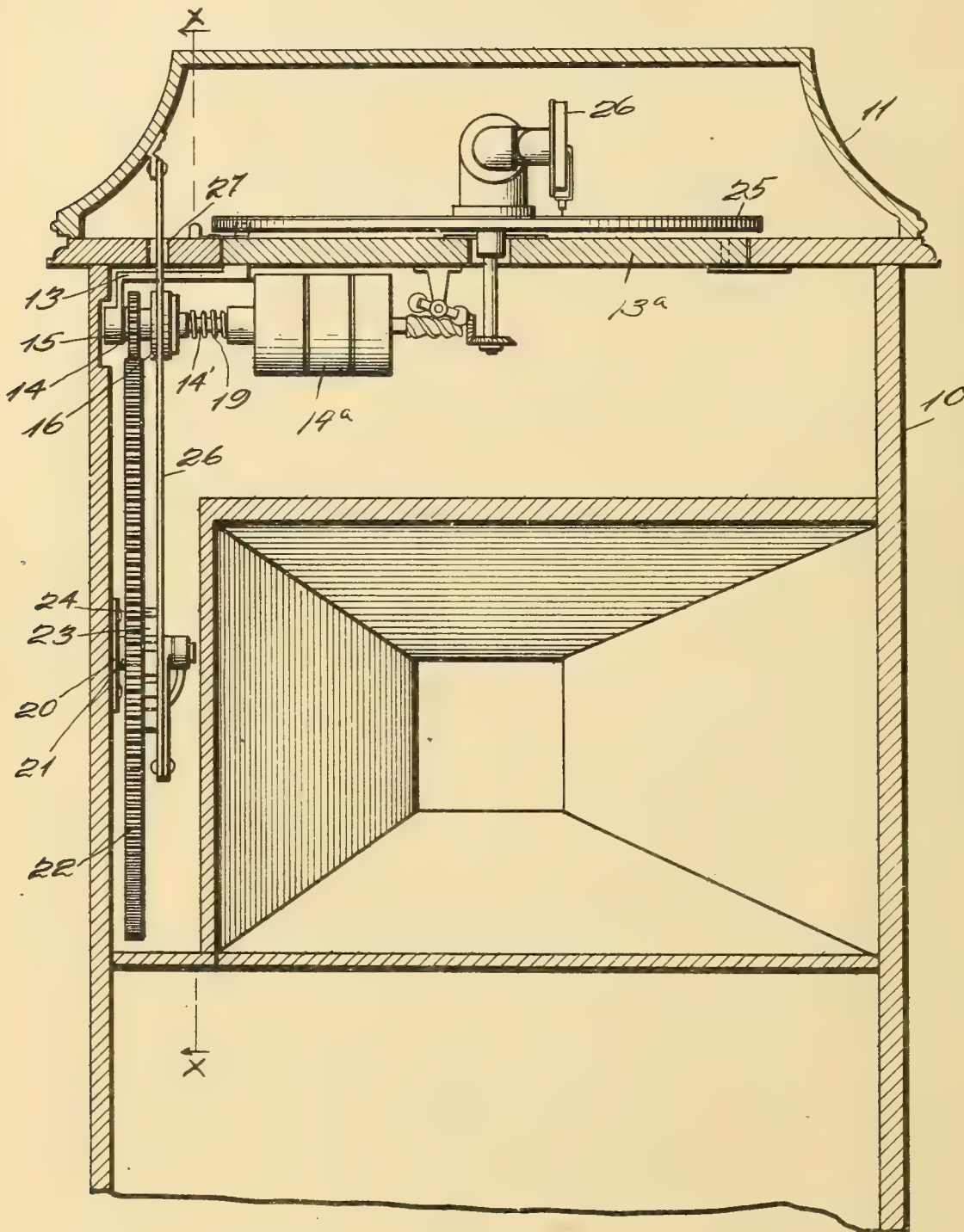


Fig. 1.

Inventors
Samuel W. Meredith,
Leopold Baumann Sr.
James Black,
By Norman J. Whitaker.
their Attorney

S. W. MEREDITH, L. BAUMANN, SR. & J. BLACK.

WINDING MECHANISM FOR SPRING MOTORS.

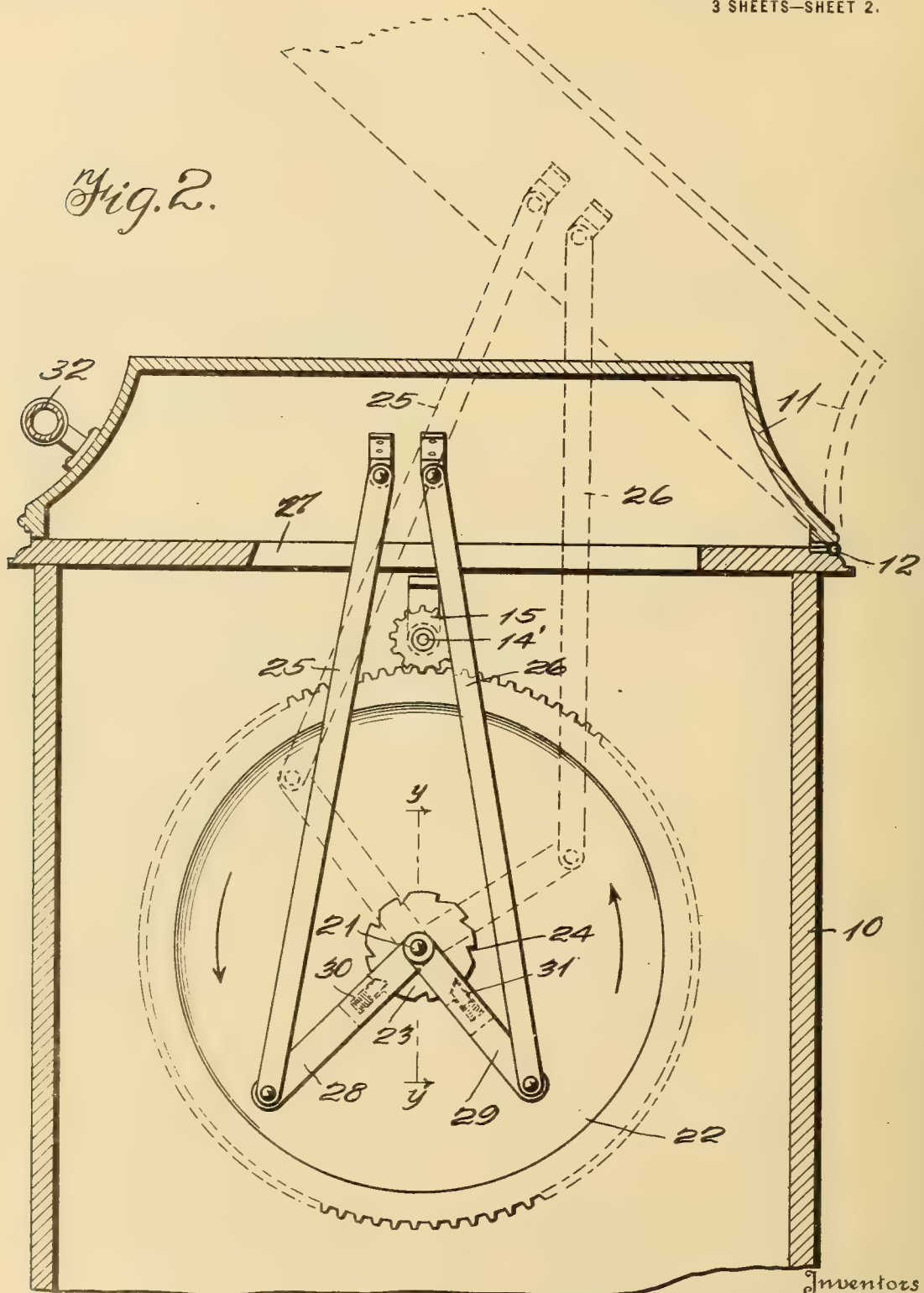
APPLICATION FILED FEB. 15, 1917.

1,265,473.

Patented May 7, 1918.

3 SHEETS—SHEET 2.

Fig. 2.



Inventors

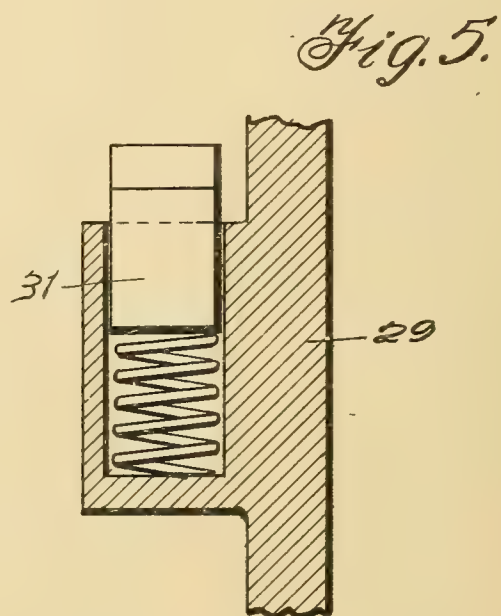
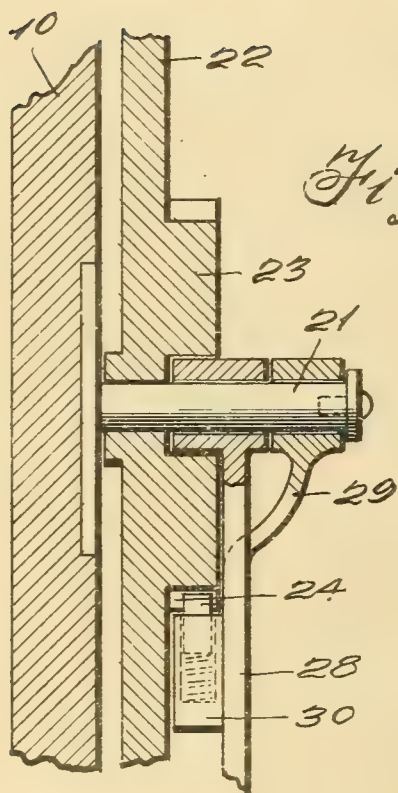
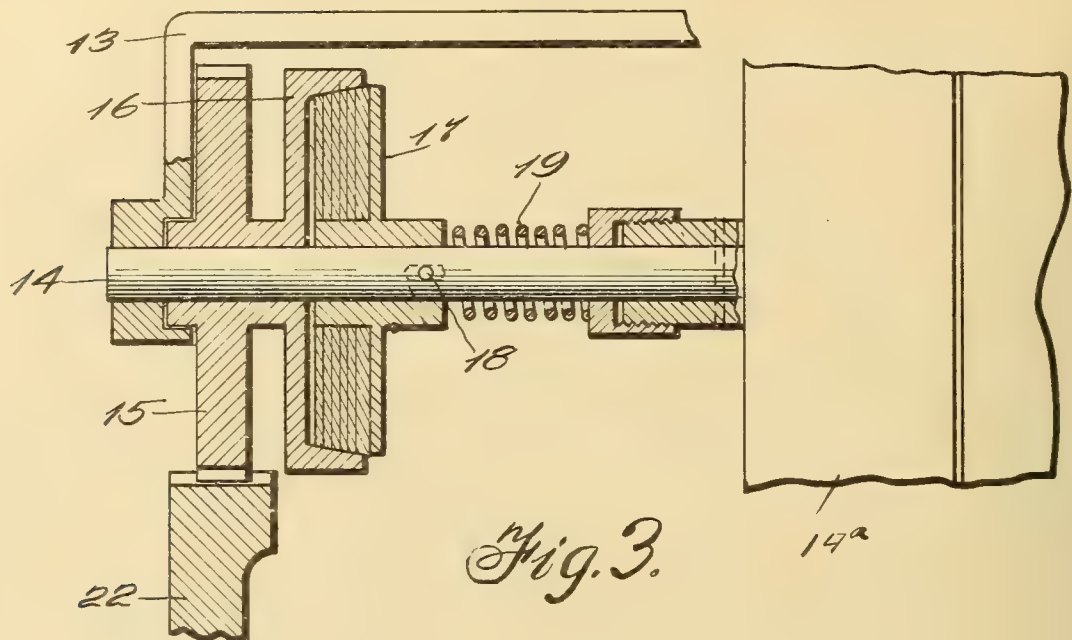
*Samuel W. Meredith,
Leopold Baumann, Sr.
James Black,*

*By Norman J. Whitaker
their Attorney*

S. W. MEREDITH, L. BAUMANN, SR. & J. BLACK.
WINDING MECHANISM FOR SPRING MOTORS.
APPLICATION FILED FEB. 15, 1917.

1,265,473.

Patented May 7, 1918.
3 SHEETS—SHEET 3.



Inventors
Samuel W. Meredith,
Leopold Baumann Sr.
James Black,

By Norman J. Whitaker
their Attorney

UNITED STATES PATENT OFFICE.

SAMUEL W. MEREDITH AND LEOPOLD BAUMANN, SR., OF PHILADELPHIA, PENNSYLVANIA, AND JAMES BLACK, OF THOROFARE, NEW JERSEY.

WINDING MECHANISM FOR SPRING-MOTORS.

1,265,473.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed February 15, 1917. Serial No. 148,875.

To all whom it may concern:

Be it known that we, SAMUEL W. MEREDITH, LEOPOLD BAUMANN, Sr., and JAMES BLACK, citizens of the United States, and residents of Philadelphia, in the county of Philadelphia and State of Pennsylvania, Philadelphia, in the county of Philadelphia and State of Pennsylvania, and Thorofare, in the county of Gloucester and State of New Jersey, respectively, have invented new and useful improvements in Winding Mechanism for Spring-Motors, of which the following is a specification.

This invention relates to automatic musical instruments and has particular reference to talking machines of the spring motor type.

The primary object of this invention is to provide a means whereby the spring of the motor will be automatically wound upon raising and lowering the lid of the casing, requiring no attention whatsoever of the operator for this purpose.

A further object of this invention is to provide means whereby upon the opening or closing of the casing lid, the motor will be wound for the succeeding record of maximum size irrespective of the size of the preceding record and the corresponding unwinding of the spring for it.

With the foregoing and other objects in view, the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed or suggested herein, still for the purpose of illustrating a practical embodiment thereof, reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which,

Figure 1 is a central transverse section of a talking machine illustrating one form of our improvement,

Fig. 2 is a vertical section at right angles to the plane of Fig. 1 and taken on the line X—X of Fig. 1,

Fig. 3 is an enlarged section of the frictional clutch and its associated elements shown in Fig. 1,

Fig. 4 is an enlarged cross sectional view of certain parts shown in Fig. 1, and

Fig. 5 is an enlarged cross sectional view of one of the arms shown in Fig. 2 and also shows a spring actuated pawl mounted on said arm.

Referring now more particularly to the drawings, the numeral 10 denotes a talking machine cabinet of any ordinary construction having associated therewith the usual turn-table 25 upon which the records are supported in the usual manner for cooperation with a reproducer 26. The cabinet is provided with a lid 11 hinged at 12 to swing upwardly as illustrated by dotted lines in Fig. 2.

The spring motor mechanism is of a more or less conventional type and no description of the same is necessary.

Secured to the bed 13^a of the cabinet which is removable to allow access to the spring motor 14^a and its associated elements is a bracket 13. The spring motor 14^a is carried by the removable bed 13^a, as is obvious. This bracket is substantially of right angle shape, one end thereof serving as a journal or supporting means for a rotatable shaft 14. Rotatably mounted near the end of the shaft 14 is a gear wheel 15 which has formed integral therewith one portion of a frictional clutch 16.

Splined to the shaft 14 as shown at 18 and in such a position that it will be held in frictional contact with the element 16 of the clutch, is the remaining portion 17 of the frictional clutch.

The shaft 14' is employed to wind the spring motor 14^a. The portion 17 is held in engagement with the portion 16 by means of the coil spring 19. By means of this construction, it will be seen that should the spring motor be completely wound when the lid 11 is in some position where easy access to the turn table 25 is not obtainable, the lid may be completely raised. In doing this the gear wheel 22 hereafter mentioned and its associated gear 15 with its clutch member 16 will necessarily be compelled to rotate. This is allowed by means of the construction shown in Fig. 3.

Mounted within the cabinet and secured thereto by means of a plate 20 as shown in Fig. 1, is a short stub shaft 21. This stub

shaft 21 has rotatably mounted thereon a relatively large gear 22 which meshes with the gear 15 above described. The gear 22 carries an enlarged portion 23 provided with 5 teeth 24. This portion 23 forms in effect a ratchet. Pivottally secured to one side of the lid 11 are arms 25 and 26. These arms project downwardly into the cabinet through an opening 27 arranged in the top of the 10 cabinet. Secured to the lower ends of the arms 25 and 26 are members 28 and 29 respectively. These members 28 and 29 are mounted on the stub shaft 21 and are adapted to swing in a vertical plane, it being understood that these members have no permanent or fixed engagement with the stub shaft 21. Mounted on member 28 and in such a position that it will engage the teeth 24 on the ratchet 23, is a spring actuated pawl 30. This pawl is so arranged that when engaged in the teeth 24 of the ratchet 23, it will impart a rotary movement to the ratchet 23 upon the downward motion of the arms 25 and 28. Secured to 25 the arm 29 and in a position similar to the pawl 30 is a spring actuated pawl 31 which is also adapted to engage in the teeth 24 of the ratchet 23 and impart a rotary movement to the ratchet 23 upon the upward 30 movement of the arms 26 and 29. The positions which the arms 25 and 26, 28 and 29 assume upon raising the lid are shown in dotted lines in Fig. 2.

In Fig. 4 is shown a detailed cross sectional view of the arms 28 and 29 with the spring actuated pawl on arm 28 engaged in one of the teeth 24 of the ratchet 23. The means for holding the arms 28 and 29 in position upon the stub shaft 21 is also shown 40 in this figure.

In Fig. 5 is shown a detailed cross sectional view of the arm 29 and its associated spring actuated pawl 31.

Secured to the front of the lid 11 of the 45 cabinet is a handle 32 which is used to assist in raising and lowering the lid. The operation of this device is as follows:—

The lid 11 ordinarily is positioned as shown in Fig. 2. In order to place a record upon the turn-table 25, it is obviously necessary that the lid be raised. After a record has been played a certain amount of tension in the spring motor has been used up and if a sufficient number of records have been 55 played without a rewinding of the motor, the spring motor will become entirely unwound. In ordinary use, a crank is employed to wind up the spring motor, the crank is generally mounted exteriorly of the cabinet and to rewind the motor by this crank necessitates a loss of time and energy. By our device the disadvantages of the crank are eliminated and it is only necessary to raise and lower the lid a couple of times 65 to completely wind the motor. Upon rais-

ing the lid the arms 25 and 26 will be moved accordingly and the spring actuated pawl 31 will engage in one of the teeth 24 of the ratchet 23. The ratchet 23 being secured or formed integral with the relatively 70 large gear 22, a rotary movement will be imparted to the gear 22. The large gear 22 meshes with the smaller gear 15 and hence upon the rotation of gear 22 the gear 15 will be rotated accordingly. Upon the rotation 75 of the gear 15, the portions 16 and 17 of the frictional clutch will cause a rotary movement of the shaft because of its connection therewith by the slot and key 18. Upon the rotation of the shafts 14 and 14' it is obvious that a winding of the spring motor will be accomplished. Upon the lowering of the lid 11, the spring actuated pawl 30 will engage in one of the teeth 24 of the ratchet 23 and cause the winding of the spring motor in a manner similar to that described 85 above.

From the foregoing description taken in connection with the accompanying drawing, the advantages of the construction and 90 method of operation will be readily understood by those skilled in the art to which the invention appertains, and while we have described the principle of operation, together with the device which we now consider to be the best embodiment thereof, we desire to have it understood that the device shown is merely illustrative and that such changes may be made when desired as fall within the scope of the appended 100 claims.

What we claim is:—

In an apparatus of the character described, the combination with the cabinet of a sound reproducing machine, of a lid 105 pivoted thereto, a removable bed secured to the upper portion of the cabinet, a spring motor carried by the bed, said spring motor being provided with a winding shaft, a bracket secured to said bed, a gear carried 110 by said bracket, a friction clutch connecting said gear with the winding shaft of said spring motor, a second gear pivottally connected to the inner side of said cabinet and normally engaging the first named gear, the 115 first named gear being free to disengage the second named gear upon the removal of said bed, and means for imparting rotary motion in a common direction to the last named gear upon the upward and downward swinging movement of said lid for winding the spring of said spring motor, said means comprising a ratchet-wheel centrally connected to the latter named gear, a pair of arms pivoted centrally to said ratchet-wheel and having 120 their outer ends normally disposed upon opposite sides of a vertical plane passed longitudinally through the axis of said ratchet, a second pair of arms connected to the first named pair of arms and to said lid 130

whereby an oscillatory movement may be imparted to said arms upon the upward and downward movement of said lid, a spring pressed pawl carried by each of the arms of the first named pair, one of said pawls being arranged to engage the teeth of said ratchet-wheel upon the upward movement of said lid while the other of said lugs is adapted to engage the teeth of said ratchet wheel upon the downward movement of said lid. 10

SAMUEL W. MEREDITH.
LEOPOLD BAUMANN, SR.
JAMES BLACK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TALKING MACHINE MECHANISM.

1,265,498 ----- A. E. Parnall,
Filed Sept. 18, 1916,
Patented May 7, 1918.

A. E. PARNALL.
TALKING MACHINE MECHANISM.
APPLICATION FILED SEPT. 18, 1916.

1,265,498.

Patented May 7, 1918.

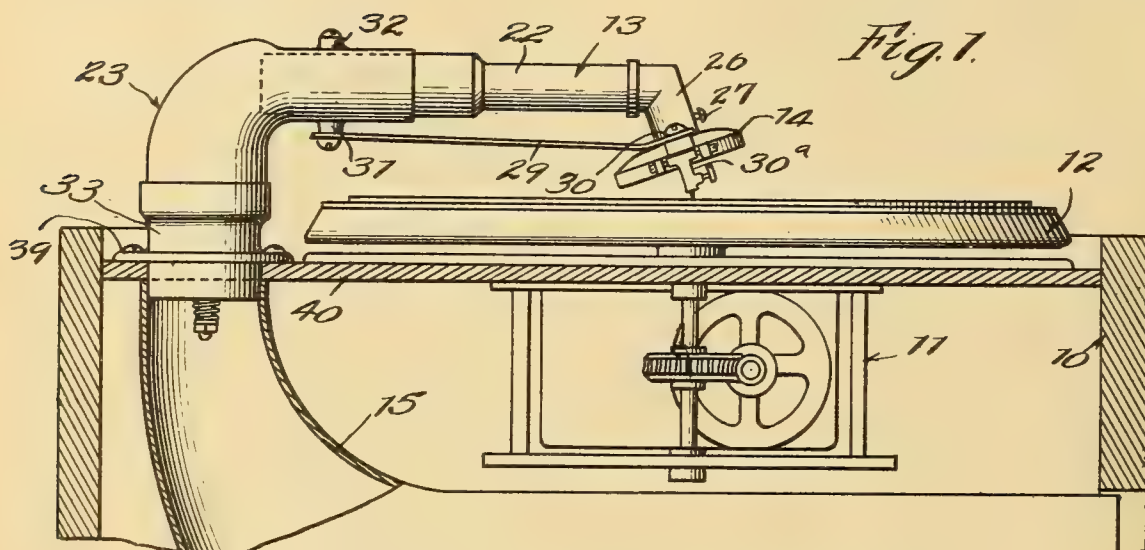
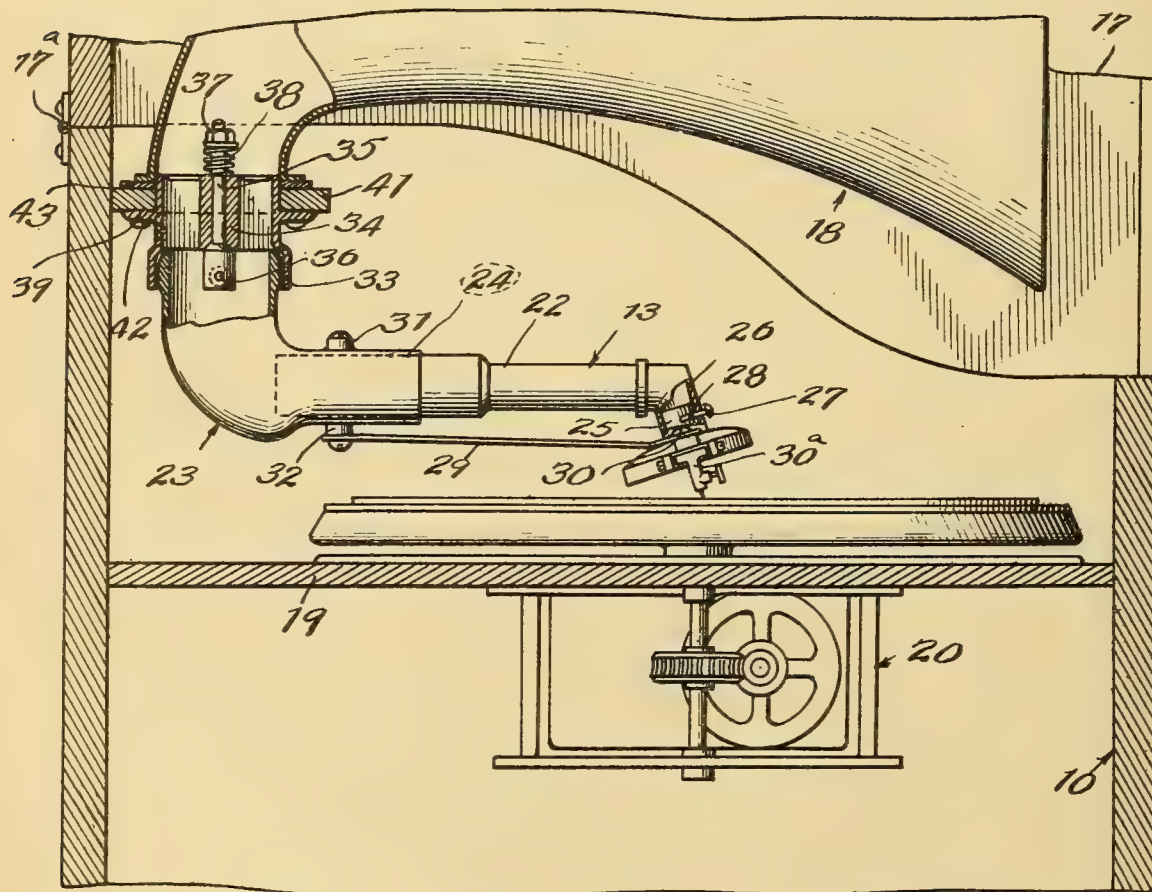


Fig. 2.



Witnesses.
H. & Barrett.
E. Kane

Inventor
Archie E. Parnall.
Jones, Addington, Ames & Seibold
By Atty.

UNITED STATES PATENT OFFICE.

ARCHIE E. PARNALL, OF CHICAGO, ILLINOIS, ASSIGNOR TO FRANK W. WILLIAMS, OF CHICAGO, ILLINOIS.

TALKING-MACHINE MECHANISM.

1,265,498.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed September 18, 1916. Serial No. 120,819.

To all whom it may concern:

Be it known that I, ARCHIE E. PARNALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Talking-Machine Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to talking machine mechanism.

One of the objects of my invention is to provide improved means whereby the tone arm may be connected with machines having different types of amplifiers.

In the drawings, in which my invention is shown—

Figure 1 is a vertical section of a talking machine in which the amplifier is inclosed in a casing below the record support; and

Fig. 2 is a vertical section of a talking machine in which the amplifier is mounted above the record support.

Referring to the drawings in detail and first to Fig. 1, the talking machine here shown comprises a casing 10, driving transmission mechanism 11 mounted in the casing, a record support 12 driven from the mechanism 11, a tone arm 13, a sound box 14 supported by the tone arm, and an amplifier 15 with which the tone arm 13 communicates inside the casing 10 and below the record support.

Referring to Fig. 2 the talking machine here shown comprises a casing 16, having a top or cover 17 hinged thereto at 17^a, an amplifier 18 supported by the cover 17 to swing therewith, a support or partition 19 for the driving transmission mechanism 20, and a record support 21 driven from the mechanism 20. The tone arm 13 and sound box 14 may be the same as in Fig. 1.

In order that the tone arm may be made to communicate either with an amplifier below the record support, as in Fig. 1, or with an amplifier above the record support, as in Fig. 2, the tone arm has a straight tubular portion 22 for communication with the sound box, and a tubular elbow portion 23 for communication with the amplifier rotatably and telescopically connected with the straight portion at 24. In order that the sound box may be used either with a hill and dale groove record or a laterally

undulating groove record, it is mounted to rotate on the tone arm about an axis lying in a vertical plane through the axis of the tone arm, from a position in which the needle is directly under the axis of the tone arm for use with the hill and dale groove record, to a position at one side of this vertical plane for use with a laterally undulating groove record. For this purpose the sound box has a central axial tubular projection 25 rotatably mounted in the down-turned tubular end portion 26 of the tone arm.

For holding the sound box in position on the tone arm a screw 27 may be threaded through the tubular portion 26 and extend into a slot 28 in the projection 25. In order that simply pulling out or pushing in the straight portion 22 of the tone arm will effect rotation of the sound box a link 29 has a pivotal connection 30 with the sound box adjacent the needle holder 30^a, and pivotal connections 31 and 22 on opposite sides of the elbow portion 23 are provided for the other end of the link 29 so that the link can be connected to the elbow portion either in the position shown in Fig. 1 or in the position shown in Fig. 2.

The rotation of the sound box necessitates a tilting movement of the tone arm about a horizontal axis in addition to the swinging movement about a vertical axis. To provide for this movement about horizontal and vertical axes a tubular support and connection 33 has a central bearing 34 in which is mounted a shaft or pin 35 which carries a cross shaft or pin 36 about which the tone arm tilts as an axis. The pin 35 is held in position in the bearing 34 by means of a nut 37 threaded on the end of the pin and a coil spring 38 located between the nut and the bearing. The tubular support 33 is provided with a flange 39 which in the machine shown in Fig. 1 engages the support 40, and in the form of machine shown in Fig. 2 engages the support 41. The tubular support 33 may be secured to the supports 40 and 41 by means of screws 42 extending through the flange. In the machine shown in Fig. 2 a felt washer 43 may be provided to engage the entrance to the amplifier 18 to act as a cushion and provide a tight connection. To remove the tone arm 13 from the machine of Fig. 1 and place it in the machine of Fig. 2 the screws 39 are removed, the link 29 is disconnected

at 31. The portions 22 and 23 of the tone arm are rotated relative to each other through an angle of 180 degrees. The link 29 is connected with the elbow portion of the tone arm at 32, the tubular support 33 is placed in position as shown in Fig. 2 and the screws 39 are inserted to hold the support 33 in place. The top or cover 17 is then turned down to the position shown in Fig. 2 bringing the smaller end of the amplifier down on the felt washer 43.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A talking machine mechanism comprising a record support, an extensible tone arm, a sound box mounted to rotate about an axis lying in a vertical plane through the axis of the tone arm from a position in which the needle will properly engage a laterally undulating groove record to a position in which it will properly engage a hill and dale groove record, means whereby extending said tone arm will cause rotation of said sound box, and an amplifier connec-

tion constructed so that it can be made to communicate either with an amplifier below the record support or with an amplifier above the record support.

2. A talking machine mechanism comprising a record support, an extensible tone arm, a sound box mounted to rotate about an axis lying in a vertical plane through the axis of the tone arm from a position in which the needle will properly engage a laterally undulating groove record to a position in which it will properly engage a hill and dale groove record, said tone arm comprising two sections telescopically connected, one of said sections supporting said sound box and means whereby the extension of said tone arm will cause rotation of said sound box, said means including a link pivotally connected to said sound box and adapted to be pivotally connected to the other section in two different positions of rotative adjustment.

In witness whereof, I have hereunto subscribed my name.

ARCHIE E. PARNALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH.

1,265,302 ----- M. E. Peal,
Filed Apr. 20, 1916,
Patented May 7, 1918.

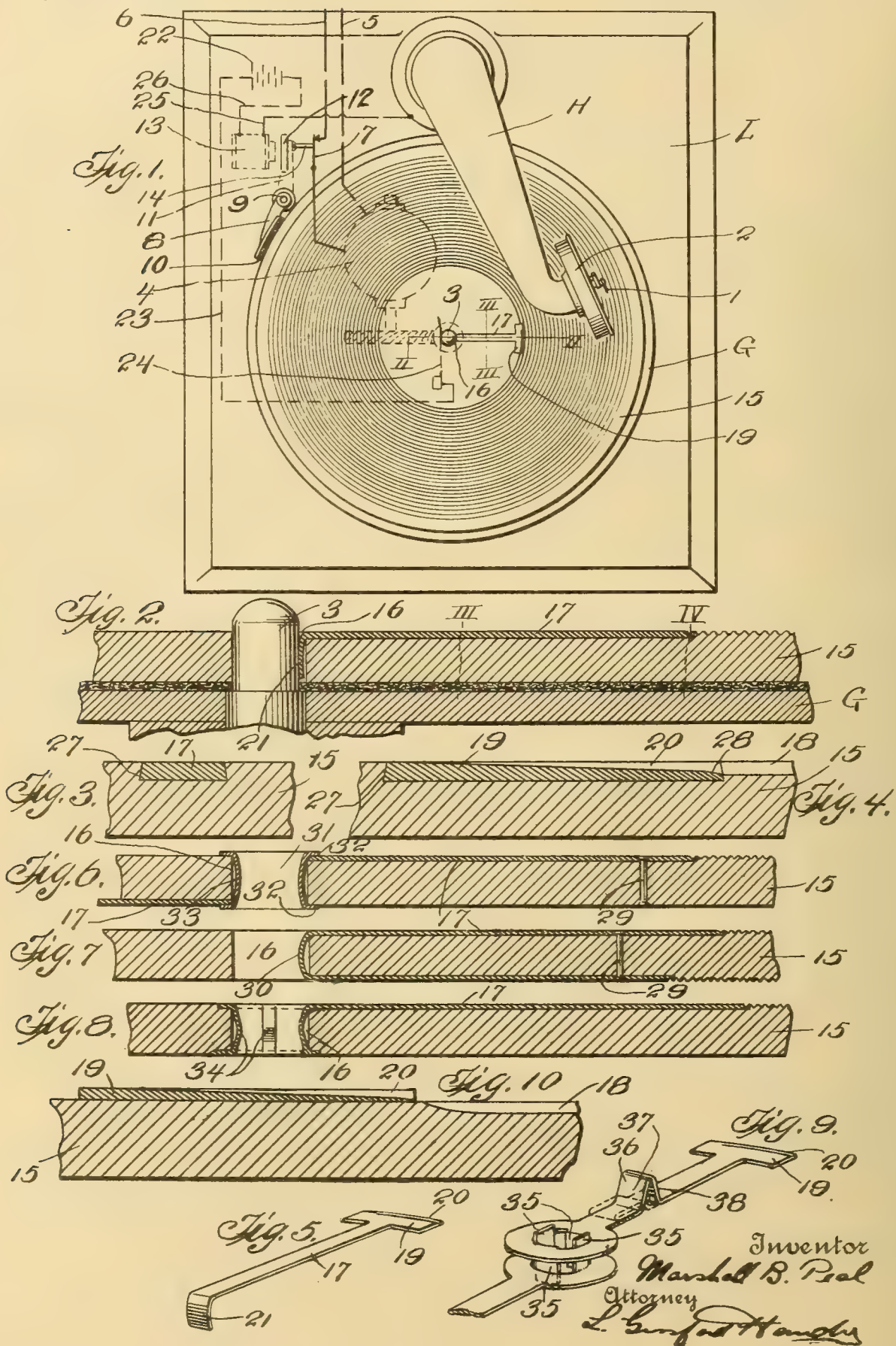
M. B. PEAL.

PHONOGRAPH.

APPLICATION FILED APR. 20, 1916.

1,265,502.

Patented May 7, 1918.



UNITED STATES PATENT OFFICE.

MARSHALL B. PEAL, OF BROOKLYN, NEW YORK.

PHONOGRAPH.

1,265,502.

Specification of Letters Patent.

Patented May 7, 1918.

Application filed April 20, 1916. Serial No. 92,563.

To all whom it may concern:

Be it known that I, MARSHALL B. PEAL, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

This invention relates to a phonograph, and particularly to means for automatically causing the phonograph to cease all mechanical motion after the stylus or needle has completed its course of travel relatively to the sound producing surface of the record.

A further object is to provide a record having means adapted to coöperate with features embodied in the phonograph structure for causing the rotation of the record to cease after the sound producing surface of the record has been traversed by the stylus or needle.

A further object is to provide a device which may be either incorporated into the record at the time of manufacture of the record, or which may be attached to the record at a subsequent time adapted to coöperate with features of the phonograph machine for causing the operation of the machine to cease at a pre-determined time.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles, constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown a merely preferred form of embodiment of the invention:

Figure 1 is a top plan view of a phonograph machine having a record in position thereon, provided with this invention, certain mechanism of the machine being illustrated diagrammatically.

Fig. 2 is an enlarged vertical detail sectional view taken upon the plane of line II—II of Fig. 1.

Fig. 3 is a fragmentary sectional view taken upon the plane of line III—III of Figs. 1 and 2.

Fig. 4 is a similar view taken upon the plane of line IV—IV of Fig. 2.

Fig. 5 is a perspective view of one of the parts included in this invention.

Figs. 6, 7 and 8 illustrate modifications.

Fig. 9 is a perspective view illustrating a further modification; and

Fig. 10 is an enlarged sectional view illustrating still a further modification.

Referring to the drawings for a detailed description of the structure illustrated therein, the reference character L indicates the box or casing of the phonograph machine, and G the rotatable table carried thereby. The sound horn is indicated by the reference character H, and is pivotally mounted upon the casing to permit the stylus or needle 1 of the reproducer 2 to travel freely along the sound producing surface of the record toward and away from the center post 3 of the table G in the usual manner.

Any suitable means may be employed for rotating the table G. In the drawings an electric motor 4 is illustrated for this purpose, the same being driven from a suitable source applied through the wires 5 and 6, and being controlled by a switch 7 arranged in the wire 6 for making or breaking the circuit along said wire.

If desired, a brake may be employed. In the drawings the reference character 8 indicates a form of brake for illustrative purposes. This comprises an arm which is mounted upon a rotatable spindle 9 and which is provided with a friction surface 10 disposed to be pressed into braking contact with the peripheral portion of the table G when the spindle 9 is rotated. An arm 11 is also provided upon the spindle and this is furnished with an armature 12 arranged to be controlled by an electro-magnet 13. A link 14 connects the arm 11 with the switch 7 so that when said arm is drawn toward the magnet 13, the switch will be swung to break the circuit along the wire 6.

Thus, when the driving power in the motor is discontinued, a brake is simultaneously applied to the table for overcoming the momentum therein.

The record is indicated by the reference numeral 15. It is of the usual form and is provided with the central aperture 16 for receiving the post 3. A contact member 17 is arranged to extend from the aperture 16 to a point coincident with the innermost convolution 18 of the sound producing groove in the record. The outer end, as 19,

may be enlarged and may, if desired, be provided with a groove 20 registering with the innermost convolution 18 of the sound producing groove. The inner end is adapted to make electrical contact with the post 3. Any suitable means may be employed for improving the quality of the electrical contact with the post, but for simplicity that illustrated in Figs. 2 and 5 will serve as an illustration. This means includes a downwardly bent portion 21 at the inner end of the contact member, said portion 21 extending into the opening 16 and comprising a resilient finger adapted to produce a constant pressure against the post. Both the contact member and the post being of metal, it follows that an electric current may be transmitted from one to the other through the finger 21.

When the stylus or needle 1 has moved inwardly into the innermost convolution of the sound producing groove, and the outer end of the contact member 17 rotates into engagement therewith, electrical contact will be made between the stylus and the contact member.

A circuit for the magnet 13 will be established as follows: from the source 22 along wire 23 to a brush, or its equivalent, 24, into electrical connection with the post 3 of the table, from the post 3 along the contact member 17, through the stylus 1 through the horn arm H, along wire 25, through the magnet 13, and along wire 26, back to the source.

The outer end of the contact member 17 may be disposed precisely at the end of the innermost convolution of the sound producing groove, if desired, but usually it is sufficient to dispose the outer end of the contact member at a point somewhat beyond the end of the sound producing groove so as to be engaged by the stylus after the stylus has completed the travel of the groove.

Since the contact member 17 need be only of extremely thin sheet metal, it may rest directly upon the face of the record disk. However, as a simple means for connecting the contact member with the disk, this invention contemplates that the contact member be pressed or sunken into the surface of the disk, preferably at a time when the disk is not fully hardened. The marginal edges of the contact member may be beveled so as to obtain a better grip upon the material of the disk, if desired, as illustrated at 27, in Figs. 3 and 4. By sinking the contact member into the surface of the disk, the groove 20 in the outer end of the contact member may be brought to stand more closely in register with the innermost convolution 18 of the record as clearly shown in Fig. 4. A slight shoulder-like portion 28 is provided so as to render the electrical

engagement of the stylus with the contact member more positive and effective.

If found necessary, the contact member may be fixed to the disk by small rivets 29, as shown in Figs. 6 and 7.

Also the contact member may be duplicated if desired, at opposite surfaces of the disk. In fact, in some cases it may be desirable to form the contact members for the opposite surfaces of the disk as a single piece of metal bent through the opening 16, as shown in Fig. 7. In this case the intermediate bent part 30 will serve as a resilient portion for engaging the post 3.

When the contact members upon the two surfaces of the disk are formed as separate members, they may, if desired, be connected by a thimble-like member 31, as shown in Fig. 6. The member 31 provides flanges 32 for engaging and retaining the contact members, and it provides a somewhat resilient central portion 33 for engaging the post.

In Fig. 8 a modification is illustrated in which a thimble portion is provided directly upon the contact member, said thimble portion being formed with resilient sections 34 for engaging the post.

In Fig. 9 a modification is illustrated in which the contact member is provided with a pair of resilient bendable fingers 35. Where it is desired to attach two of these contact members to the two surfaces of the disk, the pair of fingers 35 of one may be extended through the opening in the disk and bent to engage portions of the other contact member, while the pair of fingers 35 of the other contact member may be extended through the opening in the disk and bent to engage portions of the first contact member. The pairs of fingers are preferably arranged in planes at angles to each other in the two contact members in the manner illustrated in Fig. 9.

Fig. 9 also illustrates a simple expedient for providing adjustability in the length of the contact member. Any suitable means may be employed for providing adjustability. The means illustrated includes providing a loop 36, the two legs 37 and 38 of which may be bent toward or away from each other to alter the length of the contact member. After the proper adjustment has been attained, then the loop may be bent down flat against the adjacent portions of the contact member, as illustrated by the dotted lines.

Although it is preferable to embed or sink the contact member into the material of the disk, it is, however, not necessary to do so. In Fig. 10 the contact member is shown not embedded but resting flat upon the surface of the disk.

Also it will be understood that it is not necessary in all cases to provide the groove 20 in the end of the contact member as

where the contact member is made of sufficiently thin material, the edge thereof will not constitute any appreciable resistance to the passage of the stylus thereover.

5 In some cases it may be desirable to employ thicker material, or otherwise provide a decided shoulder to be engaged by the stylus. Engagement of the stylus with this shoulder will produce the necessary electrical contact without riding over the shoulder. In this case the movement of the contact member would be arrested by engagement with the stylus and the record disk would rotate for a short distance beneath. 10 The portion of the contact member which extends into the opening 16 would provide a continuing electrical engagement with the post and would also provide a pivotal connection between the record disk and the contact member. 15

It will, of course, be understood that this invention is not to be limited to the use of an electric motor for driving the table G. The movement of the arm 11, or its equivalent, is intended to control any other type of motor, as well as that illustrated. 25

It will be understood also that the principles of this invention are not necessarily limited to the reproduction of sound from the record but may be equally well adapted to the recording operation. 30

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

35 1. A contact device for a phonograph disk, comprising a contact forming member carried by the disk extending radially from the central standard receiving opening of the disk, the inner end of the contact forming member being adapted to engage the central standard of the phonograph, the outer end portion of the contact forming member being adapted to be engaged by the stylus of the phonograph, and said contact forming member having a bendable portion bendable to alter the length of said contact forming member. 40 45

2. A contact device for a phonograph disk, comprising a contact forming member carried by the disk extending radially from the central standard receiving opening of the disk, the inner end of the contact forming member being adapted to engage the central standard of the phonograph, the outer end portion of the contact forming member being adapted to be engaged by the stylus of the phonograph, said outer end portion of the contact forming member having a groove provided in the upper surface of the material thereof disposed in continuance of the usual music groove of the record disk, for receiving the stylus, said groove in the contact forming member being of substantially the same depth as the music groove of the disk end where it registers with the music groove, 50 55 60 65

and having a shoulder-like portion formed therein for the purpose described.

3. A contact device for a phonograph disk, comprising a contact forming member carried by the disk extending radially from the central standard receiving opening of the disk, the inner end of the contact forming member being adapted to engage the central standard of the phonograph, the outer end portion of the contact forming member being adapted to be engaged by the stylus of the phonograph, edge portions of said contact forming member being beveled downwardly and outwardly, and said contact forming member being embedded in the material of the record disk so that the upper surface of the contact forming member lies substantially flush with the upper surface of the record disk and so that said beveled edges engage beneath relatively overhanging portions of the material of the record disk. 70 75 80 85

4. A contact device for a phonograph disk, comprising a contact forming member carried by the record disk, said contact forming member being made up of two parts, one part being disposed at one surface of the record disk and the other part being disposed at the opposite surface of the record disk, and means extending through the central standard receiving opening of the disk serving to hold said two parts together and adapted to form engagement with the central standard of the phonograph. 90 95

5. A contact device for a phonograph disk, comprising a contact forming member carried by the record disk, said contact forming member being made up of two independently formed parts, one part being disposed at one surface of the record disk and the other part being disposed at the opposite surface of the record disk, each of said parts having portions extending through the central standard receiving opening of the disk and engaging the other part to mutually retain said two parts against displacement, and said portions also being adapted to form engagement with the central standard of the phonograph. 100 105 110

6. A contact device for a phonograph disk, comprising a contact forming member carried by the record disk, said contact forming member being made up of two independently formed parts, one part being disposed at one surface of the record disk and the other part being disposed at the opposite surface of the record disk, each of said parts extending radially of the record disk from the central standard receiving opening of the disk, means extending through said opening serving to hold the inner ends of said two parts together and adapted to form engagement with the central standard of the phonograph, and means extending through the disk spaced from said open- 115 120 125 130

ing for holding the outer ends of said two parts in position upon the record disk.

7. A contact device for a phonograph disk, comprising a contact forming member carried by the disk at one surface thereof, said contact forming member having a portion extending through the central standard receiving opening of the disk adapted to form engagement with the central standard of the phonograph, said portion being extended beyond the opposite surface of the record disk and the extended portions being bent over to retain the contact forming member against displacement.

8. A contact device for a phonograph disk, comprising a contact forming member carried by the record disk, said contact forming member being made up of two independently formed parts, one part being disposed at one surface of the record disk and the other part being disposed at the opposite surface of the record disk, each of said opposite parts having integral fingers formed thereon extending through the central standard receiving opening of the disk into gripping engagement with the other part, and said fingers being resilient and adapted thereby to form frictional engagement with the central standard of the phonograph.

9. A contact device for a phonograph disk, comprising a contact forming member carried by the record disk, said contact forming member being made up of two independently formed parts, one part being disposed at one surface of the record disk and the other part being disposed at

the opposite surface of the record disk, one of said parts having a pair of fingers formed thereon spaced apart and extending through the central standard receiving opening of the disk and into gripping engagement with the second part to retain said second part against displacement, the second part also having a pair of fingers formed thereon extending through the central standard receiving opening of the disk in the space between the fingers of the first part and into gripping engagement with the first part to retain the first part against displacement, and said fingers being adapted to engage the central standard of the phonograph.

10. A contact device for a phonograph disk, comprising a contact forming member carried by the disk extending radially from the central standard receiving opening of the disk, the inner end of the contact forming member being adapted to engage the central standard of the phonograph, the outer end portion of the contact forming member being adapted to be engaged by the stylus of the phonograph, and said contact forming member having its intermediate portion shaped to provide a pair of legs bendable toward and away from each other for altering the length of the contact forming member.

In testimony whereof I affix my signature in the presence of two witnesses.

MARSHALL B. PEAL.

Witnesses:

L. GESSFORD HANDY,
LOUIS BRANDMIER.

SPEED REGULATOR AND INDICATOR FOR PHONOGRAPHS.

1,265,757 ----- J. H. Dooley,
Filed Dec. 26, 1916,
Renewed Oct. 17, 1917,
Patented May 14, 1918.

J. H. DOOLEY.
 SPEED REGULATOR AND INDICATOR FOR PHONOGRAPHS.
 APPLICATION FILED DEC. 26, 1916. RENEWED OCT. 17, 1917.

1,265,757.

Patented May 14, 1918.

2 SHEETS—SHEET 1.

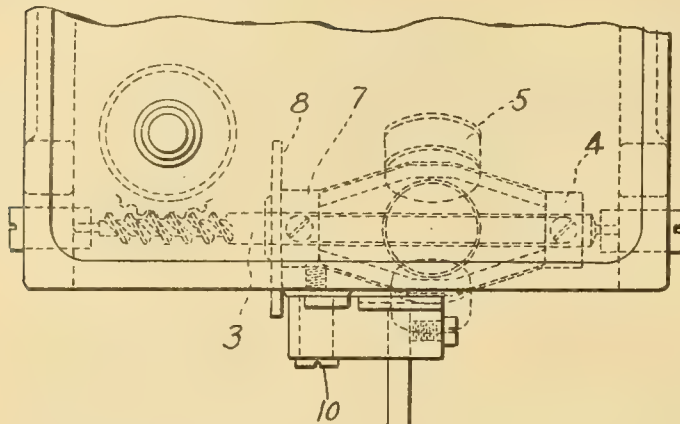


Fig. 1.

Fig. 8. Fig. 9.

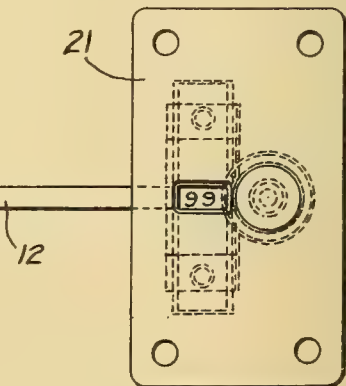
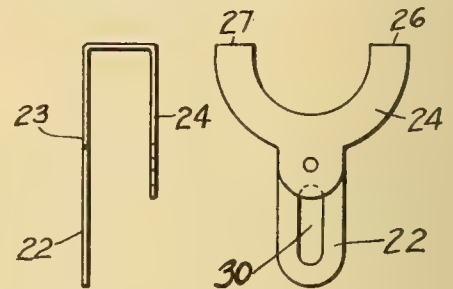
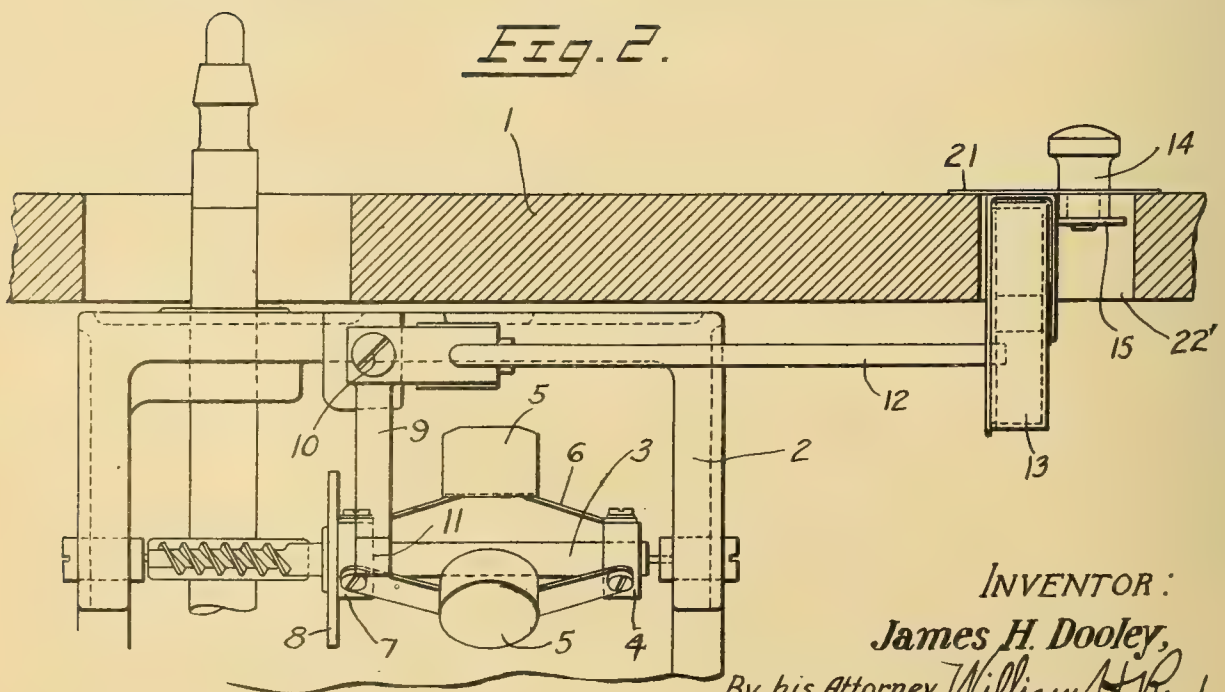


Fig. 2.



INVENTOR:
 James H. Dooley,
 By his Attorney William H. Reed.

J. H. DOOLEY.

SPEED REGULATOR AND INDICATOR FOR PHONOGRAPHS.

APPLICATION FILED DEC. 26, 1916. RENEWED OCT. 17, 1917.

1,265,757.

Patented May 14, 1918.

2 SHEETS—SHEET 2.

Fig. 3.

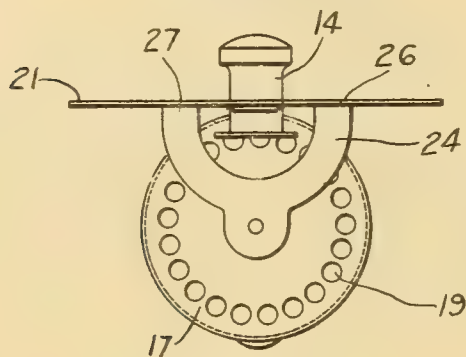


Fig. 4.

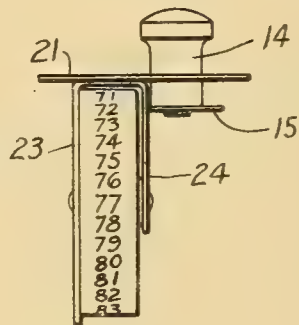


Fig. 5.

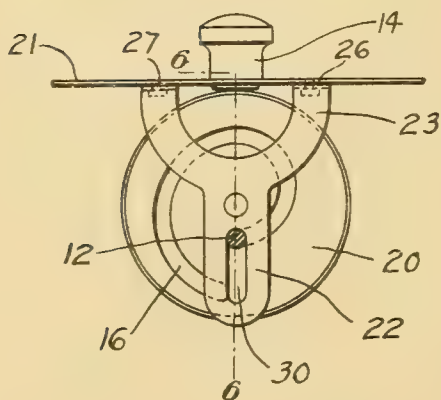


Fig. 6.

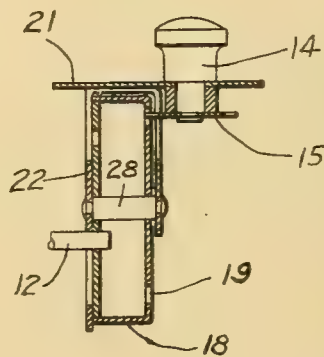
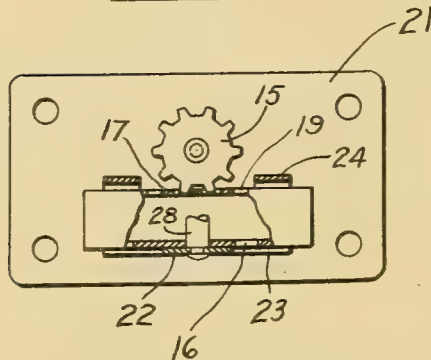


Fig. 7.



INVENTOR:

James H. Dooley.

By his Attorney, William H. Reid.

UNITED STATES PATENT OFFICE.

JAMES H. DOOLEY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO DE CAMP AND SLOAN, INC., OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SPEED REGULATOR AND INDICATOR FOR PHONOGRAPHS.

1,265,757.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed December 26, 1916, Serial No. 138,748. Renewed October 17, 1917. Serial No. 197,173.

To all whom it may concern:

Be it known that I, JAMES H. DOOLEY, a citizen of the United States, and resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Speed Regulators and Indicators for Phonographs, of which the following is a specification.

The object of the present invention is to provide an improved form of speed control for phonographs and similar devices that will be very simple and economical both in its construction and operation, and at the same time will be accurate and efficient in its results.

In the accompanying drawings showing one embodiment of my invention, Figure 1 is a side elevation of the device as applied to a phonograph mechanism. Fig. 2 is a plan view of the same parts. Fig. 3 is a side elevation of the actuating means for the control. Fig. 4 is an end elevation of the same. Fig. 5 is a view from the opposite side of that shown in Fig. 3. Fig. 6 is a section on the line 6—6 of Fig. 5. Fig. 7 is a plan view partly in section of the same parts; and Figs. 8 and 9 show the supporting frame for the indicating disk.

As shown in the drawings 1 represents the supporting board of the instrument, and 2 a frame in which is mounted the governor, comprising a shaft 3 having a collar 4 fast thereon. A series of weights 5 are connected by spring 6 between said collar 4 and a collar 7 slidable on the shaft 3. To the collar 7 is fast a disk 8 that on rotation of the shaft 3 will move along the shaft by the outward swing of the weights 5. It is customary in this art to provide an arm to engage this disk 8 when on elevation of the speed it is desired to retard the rotation of the shaft 3. I show an arm 9 pivoted at 10 to swing toward and from the disk 8 and which has a buffer 11 that engages the disk. The arm 9 is provided with an extension 12 whereby its position can be varied.

To swing the arm 12 I provide a suitable drum 13 rotatably mounted and which is swung by a suitable head 14 having a gear 15 thereon that engages the drum to turn the same. In one face of the drum I arrange a spiral slot 16 into which the end portion of the extension 12 projects. On turning the head, the drum will rotate, and the

arm 12 will have its free end move vertically up or down and this will swing the arm 9 to shift the buffer to and from the disk 8 of the governor. Obviously this change of position of the buffer will cause it to be engaged by the disk at a higher or lower speed of the governor and thereby regulate the maximum speed at which the instrument will operate.

As shown the drum is in the form of a hollow shell having two face plates and a periphery or sleeve. One of these face plates and the sleeve may be integral in the form of a cup and the other disk is rigidly connected to the top of the cup. As shown, the disk 17 has the sleeve or periphery 18 integral therewith, which disk has a circular series of apertures 19, adapted to engage the teeth of the gear 15 fast on the head 14. The spiral slot 16 is cut in the disk 20 that is secured to the cup shaped member.

I provide a supporting plate 21 in which the head 14 is rotatably mounted with the head above the plate, and the gear 15 below the same. This supporting plate is secured at an opening 22' in the board 1 of the instrument. The hollow drum 13, is shown as supported by a frame comprising a slotted arm 22 on one side having a curved extension 23, that connects with a similar curved extension 24 parallel thereto on the opposite side, these curved portions being connected by base portions 26 and 27, that are secured to the supporting plate 21 on each side of the head 14. These parallel plates 23 and 24 support the spindle 28 on which the drum 13 rotates, in position for engagement with the gear 15. The extension 22 contains a vertical slot 30 that is radial of the drum and adjacent the spiral slot 16. It will be seen from Figs. 2 and 6 that the arm extension 12 projects through the slot 30 into the spiral slot 16. On turning the head 14, the portion of the spiral slot registering with the radial slot, will advance to and from the axis of the drum and the arm will thus be swung in the radial slot. This movement will shift the buffer to and from the friction disk 8 of the governor. It is evident that the spiral slot will act as a cam, and the drum will remain in any position to which turned by the head.

It will thus be seen that most of the parts are die-stamps or die-cuts and practically no machine work is required on the parts. Thus

the device is very economical to construct and at the same time very efficient in operation.

Having thus described my invention, what I claim is:—

1. In a speed control, the combination with a speed governor including a rotary disk axially movable on change of speed, of a brake arm movable toward and from the disk, an extension on said arm, a rotary drum having numbers thereon, an apertured plate adjacent the drum, a rotary head, a gear on the head engaging said drum to turn the drum and cause the numbers to appear successively at the apertured plate, one face on the drum having a spiral slot engaging said extension whereby to swing the brake arm on turning of the drum by the head.

2. In a speed control the combination with a speed governor including a rotary disk axially movable on change of speed, of a brake arm movable toward and from the disk, an extension on said arm, a rotary drum having numbers thereon, the drum having a spiral slot in one face, an apertured plate adjacent the drum, a rotary head turning in said plate, a gear on the head meshing with the drum to turn the drum and bring its indications to appear successively at the apertured plate, a support for the drum comprising a base having parallel arms, a spindle supporting the drum to turn between said arms, one of said arms having a slot extending radially of the drum and adjacent the said spiral grooved face of the drum, said arm extension projecting through said slotted arm into the spiral groove whereby turning of the drum by the head will swing the extension and arm.

3. In a speed control the combination with a speed governor including a rotary disk axially movable on change of speed, of a brake arm movable toward and from the disk, an extension on said arm, a rotary hollow drum having indications on its periphery, the drum having a spiral slot in one face and a circular series of holes on the opposite face, an apertured plate adjacent the periphery of the drum, a rotary head turning in said plate, a gear on the head meshing with the apertured face of the drum to turn the drum and bring its indications

to appear successively at the apertured plate, said arm extension projecting into the spiral groove, whereby turning of the drum by the head will swing the extension and arm.

4. In a speed control the combination with a speed governor including a rotary disk axially movable on change of speed, of a brake arm movable toward and from the disk, an extension on said arm, a rotary drum having indications on its periphery, the drum having a spiral slot in one face and a circular series of holes on the opposite face, an apertured plate adjacent the periphery of the drum, a rotary head turning in said plate, a gear on the head meshing with the apertured face of the drum to turn the drum and bring its indications to appear successively at the apertured plate, a support for the drum comprising a base having parallel arms, a spindle supporting the drum to turn between said arms, one of said arms having a slot extending radially of the drum and adjacent the said spiral grooved face of the drum, said arm extension projecting through said slotted arm into the spiral groove, whereby turning of the drum by the head will swing the extension and arm.

5. In a speed control the combination with a speed governor including a brake arm, an extension on said arm, a rotary drum having indications on its periphery, the drum having a spiral slot in one face, an apertured plate adjacent the drum, a rotary head turning in said plate, a gear on the head meshing with the drum to turn the drum and bring its indications to appear successively at the apertured plate, a support for the drum comprising a base having parallel arms, each arm being bifurcated at the base and connected by two bars secured to the said plate on opposite sides of the said head, a spindle supporting the drum to turn between said arms, one of said arms having a slot extending radially of the drum and adjacent the said spiral face of the drum, said arm extension projecting through said slotted arm into the spiral groove, whereby turning of the drum by the head will swing the extension and arm.

JAMES H. DOOLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

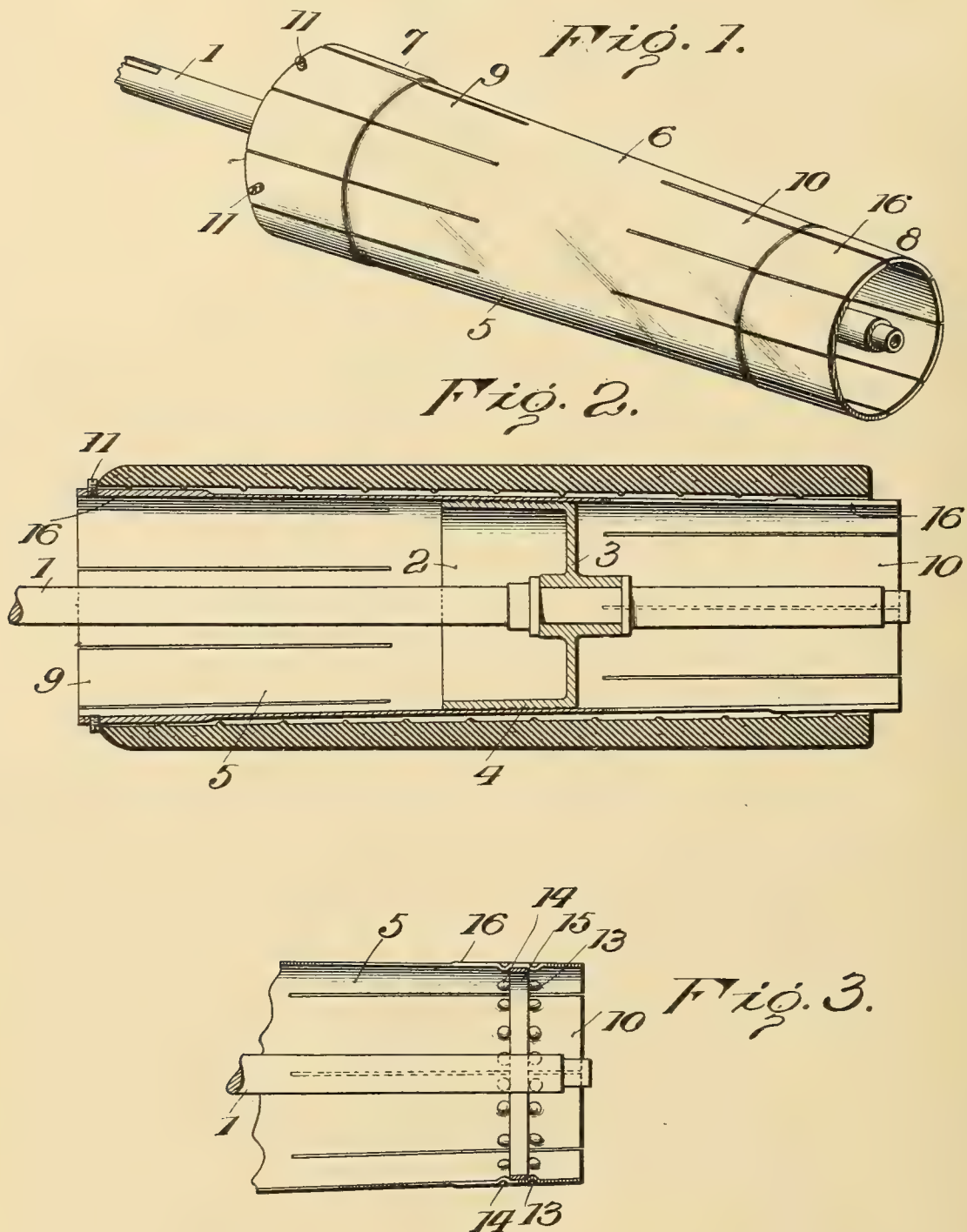
SPLIT MANDREL.

1,265,793 ----- L. G. Larsen,
Filed Mar. 10, 1916,
Patented May 14, 1918.

L. G. LARSEN.
SPLIT MANDREL.
APPLICATION FILED MAR. 10, 1916.

1,265,793.

Patented May 14, 1918.



Inventor

Louis G. Larsen

Wmro. By *Cameron, Lewis & Massie*

Attorneys

UNITED STATES PATENT OFFICE.

LOUIS G. LARSEN, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO AMERICAN GRAPHOPHONE COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF WEST VIRGINIA.

SPLIT MANDREL.

1,265,793.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed March 10, 1916. Serial No. 83,328.

To all whom it may concern:

Be it known that I, LOUIS G. LARSEN, a citizen of Denmark, and a resident of Bridgeport, Conn., have invented a new and useful Improvement in Split Mandrels, which invention is fully set forth in the following specification.

This invention relates to talking machines, and more particularly to a support for the sound-record tablets thereof. It is customary with machines employing the so-called cylindrical type of record tablet to provide a mandrel having a slightly tapered exterior surface, the bore of the tablet being correspondingly tapered to fit the mandrel with such a grip that it may be rotated thereby. In the course of manufacture slight variations occur in the dimensions of the surface of the mandrel and of the bore of the tablet, with the result that different tablets do not fit different mandrels with the same degree of accuracy, both as respects their relative taper and as respects their mean dimensions. Furthermore, as the mandrel is usually made of metal, its coefficient of expansion and contraction is different from that of the material of which the tablet is composed. Accordingly, changes of temperature effect different degrees of expansion and contraction of the tablet and mandrel. It is of importance, particularly with machines that employ correction devices, that the tablet shall always be placed in a predetermined position with relation to the mandrel and its related mechanism. Owing to the variations arising in the course of manufacture, as above indicated, and owing to different temperature conditions, a tablet frequently cannot be properly positioned upon a mandrel without danger of breaking it.

It is an object of this invention to provide a mandrel whereby the tablet may be properly gripped for rotation, and whereby it may always be properly positioned, without danger of breakage from temperature changes or from undue pressure in attempting to force the tablet to its proper position.

A further object of this invention is to provide a mandrel which shall resiliently grip the tablet only adjacent its ends, permitting ready application of the tablet upon and withdrawal of the same from the mandrel. A still further object is to provide a mandrel simple in construction, durable and easy of manufacture.

It has heretofore been proposed to accommodate the varying dimensions and temperature changes of mandrels and tablets by providing collapsible mandrels. Structures of this type as provided have had the elements of the mandrel surface so mounted as to move toward and away from the axis of the mandrel, without change of angular relation of the elements to the axis, or they have had a provision whereby the elements of the mandrel surface are mounted at a fixed distance from the axis at one end and are collapsible to various extents at the opposite end. Such structures have the objection that, while providing in the former instance for temperature changes and variations of mean diameter arising in manufacture, they have not provided for variations of taper in the bore of the tablet; or, providing in the latter instance for variations of taper in the bore of the tablet, they have inadequately provided for variations in its mean dimensions or temperature changes, whereby the tablet was improperly gripped at one end.

This invention comprises a mandrel provided with a rigid central portion and relatively and independently collapsible resilient end portions. While the resiliency of the end portions may be provided in a variety of ways, the embodiments of the invention selected for illustration comprise the provision of a plurality of tongues running longitudinally of the mandrel and conveniently produced by a series of saw-kerfs extending from each end of the mandrel. To provide for resiliently gripping the tablet only at its ends, the central portion of the mandrel is reduced in exterior diameter.

As a means of illustrating this invention, two embodiments have been selected, but it is to be understood that they are illustrative only, reference being had to the appended claims for a definition of the limits of the invention. Referring to the accompanying drawings, on which similar characters of reference indicate corresponding parts in the several figures,

Figure 1 is a perspective view of a mandrel embodying the invention;

Fig. 2 is a longitudinal central sectional view of the same, showing a record tablet in position;

Fig. 3 is a fragment of a mandrel illustrating a modified embodiment.

Referring to the drawings in detail, 1 is the usual mandrel shaft. Mounted concentrically thereon in sleeved relation thereto and retained by collars, or any other suitable means, is a short sub-mandrel 2 comprising the disk-shaped end portion 3 and the exterior cylindrical or slightly tapered portion 4. Mounted on this sub-mandrel and retained thereon in any suitable manner, as by brazing or by a driven fit, is the mandrel shell 5, preferably of metal, and comprising the intermediate rigid portion 6 and the resilient end portions 7 and 8. The resiliency of the end portions may be provided in a variety of ways. If the material of the shell is sufficiently thick to have the requisite resiliency, a plurality of tongues 9 and 10 may be provided at each end by saw-kerfs extending longitudinally inward to the desired extent. Thereby a plurality of spring tongues is provided at each end of the mandrel, which may be slightly collapsed and which have sufficient resiliency to properly grip the bore of the record tablet.

To properly position the tablet on the mandrel and that the tablet may always take a predetermined position with respect thereto, a plurality of stops or abutments 11 are provided. While these abutments may be of any desired form, in the embodiment illustrated a plurality of screw-threaded plugs are engaged in corresponding screw-threaded openings adjacent the larger end of the mandrel, and these may be riveted in position. While any desired number may be used, four are shown on the drawing.

In the embodiment of the invention illustrated, the central portion of the mandrel is reduced in exterior diameter, whereby a boss or elevation 16 is provided adjacent the outer end of each of the tongues. Thereby the tablet is supported only adjacent its ends, the central portion of the tablet being out of contact with the central portion of the mandrel, as clearly illustrated in Fig. 2. Obviously the elevations on the outer ends of the tongues could be provided in other ways without departing from the spirit of the invention.

If the material of which the shell is composed is not of sufficient resiliency, means may be provided for exerting a spring tension upon the tongues provided by the saw-kerfs. Such an embodiment is illustrated in Fig. 3 wherein the stock of the shell is shown thinner than that illustrated in Fig. 2. A plurality of indentations are pressed into the tongues adjacent their outer ends and form two concentric rings providing corresponding elevations 13 and 14 on the interior surface of the shell, but obviously continuous indentations with corresponding continuous ridges on the inside of the shell could be employed. Retained by these concentric rings of elevated points is a spring

ring 15, the ends of which are preferably overlapped. This spring ring exerts an outward tension upon the tongues, whereby they properly grip the bore of the tablet. It is to be understood that this construction as described is duplicated at the opposite end of the mandrel. Furthermore, any other suitable means for retaining the springs in position could be employed, if desired.

With a mandrel as thus constructed, the tablet is gripped sufficiently to properly rotate the same, while it is also easily withdrawn from or placed upon the mandrel, owing to the reduced area of contact between the bore of the tablet and the surface of the mandrel and the resiliency of the tablet contacting portions. Furthermore, by the resiliency either inherent in the tongues or as added to the tongues by that of the spring ring, as shown in Fig. 3, the tablet is properly gripped without danger of breakage, notwithstanding slight variations in taper and mean dimensions that may arise in course of manufacture or through temperature changes.

While the two embodiments illustrated have been described with considerable particularity, it is to be expressly understood that the invention is capable of embodiment in a variety of forms, reference being had to the accompanying claims for a definition of the limits of this invention.

What is claimed is:—

1. A taper mandrel for sound-record tablets having a rigid intermediate portion and resilient end portions.

2. A taper mandrel for sound-record tablets having a rigid intermediate portion and its ends slotted to provide a plurality of spring tongues.

3. A mandrel for sound-record tablets comprising a rigid intermediate portion and a plurality of spring tongues, said tongues being provided with elevations adjacent their outer ends.

4. A mandrel for sound-record tablets comprising a rigid intermediate portion and a plurality of spring tongues at each end thereof, said tongues being provided with elevations adjacent their outer ends.

5. A mandrel for sound-record tablets having a rigid intermediate portion and independently contractible and expansible end portions.

6. A mandrel for sound-record tablets comprising a shell having a raised portion at each end and kerfs extending inwardly from each end to a considerable distance from said raised portions.

7. A mandrel for sound-record tablets having a rigid intermediate portion and resilient end portions, said end portions being independently expansible and contractible.

8. A mandrel for sound-record tablets

having resilient end portions and a rigid intermediate portion, said end portions being provided with means adjacent the ends thereof whereby the tablet is supported out
5 of contact with the central portion of said mandrel.

9. A mandrel for sound-record tablets having independently contractible and expansible end portions, said portions being
10 provided with means whereby the tablet is supported by said end portions only.

10. In combination with a sound-record tablet, a mandrel having resilient end portions contacting with said tablet only adjacent the ends of said resilient portions.
15

11. A mandrel for sound-records comprising a rigid intermediate portion, a plurality of tongues at each end thereof, and means adjacent each end of said mandrel normally
20 tending to relatively expand said tongues.

12. A mandrel for sound-record tablets comprising a rigid intermediate portion, a plurality of tongues at each end thereof, and a spring ring at each end of said mandrel
25 normally tending to relatively expand said tongues.

13. A mandrel for sound-record tablets comprising a rigid intermediate portion, a plurality of tongues at each end thereof, a
30 spring ring at each end of said mandrel normally tending to relatively expand said tongues, and means formed in said mandrel for maintaining said rings in position.

14. In combination with a sound-record
35 tablet, a mandrel provided with means to predeterminately position said tablet with respect thereto, said mandrel having a rigid intermediate portion and its ends slotted to provide a plurality of spring tongues.

40 15. In combination with a sound-record tablet, a mandrel provided with means to predeterminately position said tablet with respect thereto, said mandrel comprising in-

dependently contractible and expansible end portions.

45

16. In combination with a sound-record tablet, a mandrel provided with means to predeterminately position said tablet with respect thereto, said mandrel comprising in-
50 dependently contractible and expansible end portions, and means on said end portions whereby said tablet is supported only adjacent its ends.

17. A mandrel for sound-record tablets comprising a rigid intermediate portion and
55 resilient end portions provided with elevations adjacent the outer ends thereof.

18. A mandrel for sound-record tablets comprising independently contractible and expansible end portions provided with ele-
60 vations adjacent the outer ends thereof.

19. A mandrel for sound-record tablets comprising a rigid intermediate portion, a plurality of tongues at each end thereof, means adjacent each end of said mandrel
65 normally tending to relatively expand said tongues, and means carried by said tongues for supporting the tablet out of contact with the central portion of said mandrel.

20. In combination with a sound-record
70 tablet, a mandrel provided with means to predeterminately position said tablet with respect thereto, said mandrel comprising a rigid intermediate portion and a plurality of spring tongues at each end thereof, said
75 tongues having means whereby said tablet is supported out of contact with the central portion of said mandrel.

21. A mandrel for sound-record tablets having a rigid intermediate portion and re-
80 silient end portions comprising a plurality of spring tongues.

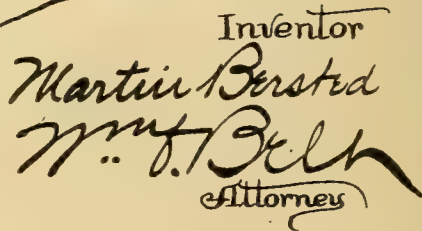
In testimony whereof I have signed this specification.

LOUIS G. LARSEN.

COVER SUPPORT FOR PHONOGRAPHS.

1,265,874 ----- M. Bersted,
Filed Dec. 10, 1917,
Patented May 14, 1918.

1,265,874.



UNITED STATES PATENT OFFICE.

MARTIN BERSTED, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

COVER-SUPPORT FOR PHONOGRAPHS.

1,265,874.

Specification of Letters Patent. Patented May 14, 1918.

Application filed December 10, 1917. Serial No. 206,435.

To all whom it may concern:

Be it known that I, MARTIN BERSTED, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cover-Supports for Phonographs, of which the following is a specification.

This invention relates to a cover support for phonographs and has for its object the provision of means for securely holding the cover in closed or opened position as desired, the cover being readily adjustable by simply grasping and moving it without the necessity of manually disengaging latches or other parts intended to hold the cover in place.

Further objects and advantages of my invention will be apparent as it is better understood by reference to the following specification when read in connection with the accompanying drawing illustrating the preferred embodiment thereof, in which—

Figure 1 is a side elevation of the device applied to a phonograph, a fragment of the latter being illustrated in section, with the parts in closed position, and

Fig. 2 is a similar view showing the parts in opened position.

Referring to the drawing 5 indicates the body of a phonograph cabinet and 6 the cover connected to the body by hinges 7 in the usual manner.

My invention comprises a base plate 8 secured to the side walls of the cabinet 5 by screws 9. A stud 10 projecting from the base plate 8 pivotally supports a member 11 having arms 12 and 13. The arm 12 is connected by a link or prop 14 to a bracket 15 fast to the cover 6.

The arm 13 is provided with a pivot 16 supporting a lever 17, one end of which is shaped to form a hook 18. A spring 19 connects the hook 18 with a similar hook 20 on an arm 21 projecting from the base plate 8.

The arm 13 is provided with an upwardly projecting lug 22 against which a screw 23, threadedly mounted in a lug 24 on the lever 17, bears to adjust the relative position of the lever 17 with respect to the arm 13. A lug 25 struck from the body of the lever 17 engages the end of the arm 13 to prevent lateral movement of the lever.

With the cover 6 disposed in closed position, the parts are arranged as indicated in Fig. 1 with the spring 19 tensioned. The

cover may be readily lifted, swinging the member 11 about its pivot until a lug 26 thereon engages a lug 25 on the base plate 8 to prevent further upward movement of the cover. In this position of the parts the spring 19 is contracted and holds the cover firmly in raised position. Owing to the peculiar construction and arrangement of the parts, the leverage exerted by the spring 19 decreases as its tension increases so that the weight of the cover is perfectly balanced at any position. The function of the screw 23 is to adjust the device so that it may be used with cabinets of varying sizes and having covers of different weights. Obviously this adjustment may be omitted with a device constructed for use with a cabinet of predetermined dimensions.

From the foregoing it will be readily understood that I have perfected a cover support for phonographs embodying novel features of construction and capable of wide application. My invention is manifesting an improvement over the props ordinarily provided in phonograph cabinets to support the cover. Phonograph cabinets embodying my invention are readily and quickly opened and closed at will and the cover is perfectly balanced at all positions. My device prevents accidental falling of the cover which not infrequently occurs and is likely to result in splitting the wood or otherwise injuring the cabinet.

Various changes may be made in the form, construction and arrangement of the parts without departing from the spirit or scope of the invention or sacrificing any of its material advantages, the form hereinbefore described being merely the preferred embodiment thereof.

I claim:

1. In a cover support for phonographs, the combination of a base adapted to be secured to the side wall of the phonograph cabinet, a member pivotally supported on said base, a link connecting the free end of said member to the hinged cover of the phonograph, an arm projecting from said member substantially perpendicular thereto and midway between its ends, a lever pivotally mounted on said arm, means for adjusting said lever about its pivotal axis relatively to said arm, an arm projecting from said base and a spring connecting said lever and last mentioned arm.

2. In a cover support for phonographs, the combination of a base adapted to be secured to the side wall of the phonograph cabinet, a member pivotally supported on
5 said base, a link connecting the free end of said member to the hinged cover of the phonograph, an arm projecting from said member substantially perpendicular thereto and
10 midway between its ends, a lever pivotally mounted on said arm, means for adjusting said lever about its pivotal axis relatively to said arm, a lug struck up from the body of said lever and adapted to slidably engage the end of said arm to prevent lateral movement of said lever, an arm projecting from
15 said base and a spring connecting said lever and last mentioned arm.

MARTIN BERSTED.

Witness:

M. A. KIDDIE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

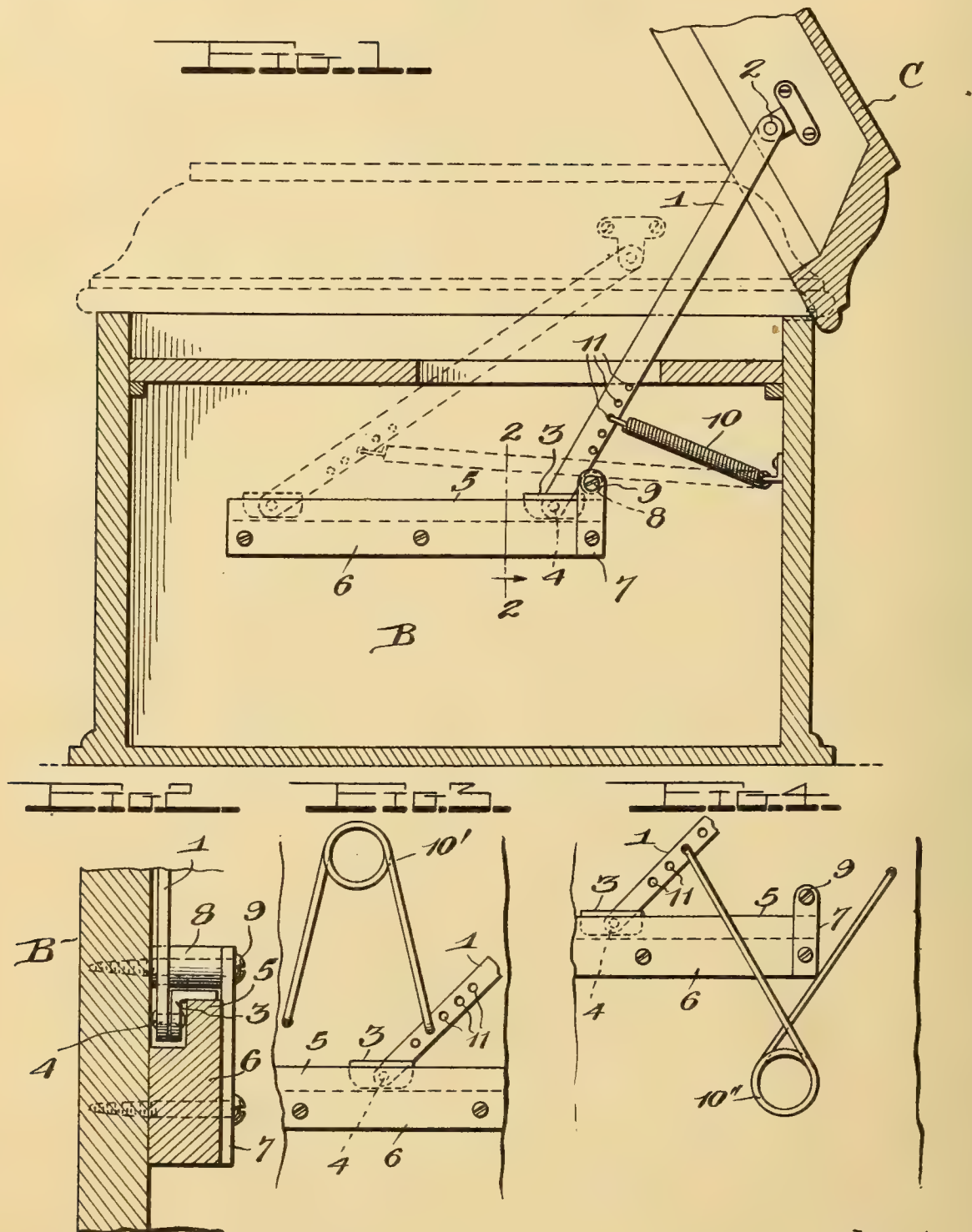
SUPPORT FOR HINGED COVERS.

1,265,930 ----- I. B. Macomber,
Filed Mar. 7, 1917,
Patented May 14, 1918.

I. B. MACOMBER.
SUPPORT FOR HINGED COVERS.
APPLICATION FILED MAR. 7, 1917.

1,265,930.

Patented May 14, 1918.



Inventor

Isaac B. Macomber

By

Joseph A. Miller

Attorney

UNITED STATES PATENT OFFICE.

ISAAC B. MACOMBER, OF PORTSMOUTH, RHODE ISLAND.

SUPPORT FOR HINGED COVERS.

1,265,930.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed March 7, 1917. Serial No. 153,221.

To all whom it may concern:

Be it known that I, ISAAC B. MACOMBER, a citizen of the United States, residing at Portsmouth, in the county of Newport and State of Rhode Island, have invented a new and useful Improvement in Supports for Hinged Covers, of which the following is a specification.

This invention relates to supports for hinged covers, and while particularly adapted for talking machine covers, is not so limited.

The object of the invention is to provide means which operates to hold the cover open, and which is overcome by the weight of the cover when the latter is closed.

In the drawings—

Figure 1 is a longitudinal sectional view of a talking machine cabinet with the present invention applied thereto.

Fig. 2 is an enlarged section on line 2—2 of Fig. 1.

Fig. 3 is a fragmentary side elevation showing a modified form of spring, and

Fig. 4 is a similar view showing a further modified form of spring.

A link 1 is pivoted at 2 to the cover C and has a shoe 3 of L-shape in cross section pivoted to its lower end by a pin 4.

The shoe 3 slides on the tread member 5 of a track 6 and is held against lateral movement by the inner side of the tread and the adjacent side of the cabinet body B.

A metal strap 7 is secured to the track 6 at the inner end of the latter and is engaged with a rubber cylindrical stop 8 the latter extending across the inner end of the track. A screw 9 passes through strap 7, and stop 8, and into body B. To secure the cover in open position, a coiled spring 10 is secured at one end to body B and at its other end in one of a series of holes 11 in link 1.

In Fig. 3 a modified form of tension spring 10' of the torsional type is employed, while in Fig. 4 a torsional spring 10'' of the compression type is employed.

When the cover is raised, the spring pulls rearwardly on link 1 until the latter encounters the stop 8, whereupon the spring acts to hold the link against the stop and the cover open. The spring also assists in opening the cover by pulling on the link. When the cover is closed the action of the spring is not sufficient to overcome the

weight of the cover and the friction incident to the shoe bearing on the track, so as to raise the cover. By employing a series of holes 11, the tension of the spring on the link may be regulated, as is believed obvious.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

1. A support for hinged covers composed of a link pivoted to the cover, a pivoted friction shoe of L-shape borne by the link, a track for securement to a body having a raised tread spaced from the inner side face of the body, the shoe riding on the track and extending in the space between the tread and body to be guided against lateral movement on the tread, a strap secured to the track, a cylindrical rubber stop engaged between the strap and body, a screw projected through the strap, through the stop and secured in the body, and a spring secured to the link and body for tensioning the link.

2. A support for hinged box covers including a link pivoted to the cover, a track, friction means pivotally connected to the link and provided with a broad flat friction face slidable along the track, and spring means connected at one end to the link and having its opposite end anchored to act on the link directly and independently of the mounting of the link for exerting tension thereon in a rearward and downward direction to increase the frictional contact between said first means and the track.

3. A support for hinged covers including a spring tensioned link pivoted to the cover, a track for securement to a body having a raised tread spaced from the inner side face of the body, said link having its lower end extending into the space between the tread and body to be guided in its movements, and an inverted L-shaped friction shoe having the horizontal flange riding on top of the track tread and its vertical flange extending into said space between the body and tread and pivoted to the link.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAAC B. MACOMBER.

Witnesses:

ADA E. HAGERTY,
J. A. MILLER.

ELECTRIC MOTOR FOR TALKING MACHINES.

1,266,062 ----- H. A. Selah,
Filed Dec. 7, 1915,
Patented May 14, 1918.

H. A. SELAH.
ELECTRIC MOTOR FOR TALKING MACHINES.
APPLICATION FILED DEC. 7, 1915.

1,266,062.

Patented May 14, 1918.
2 SHEETS—SHEET 1.

Fig. 1

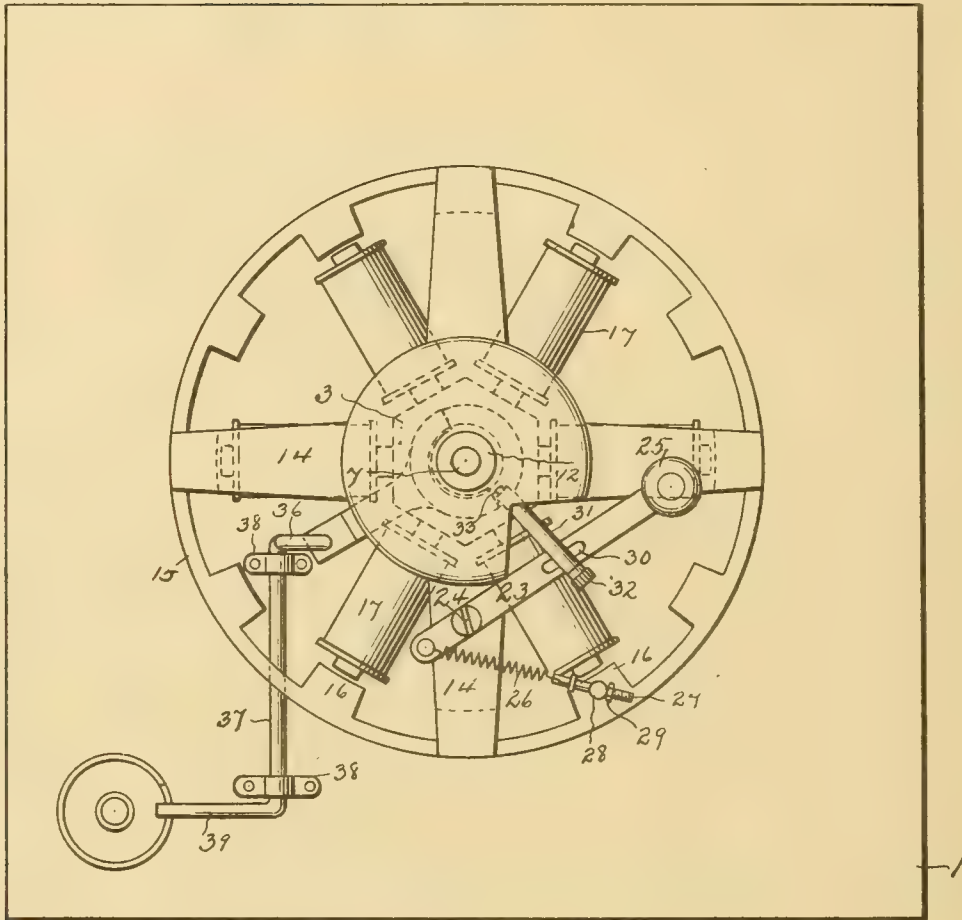
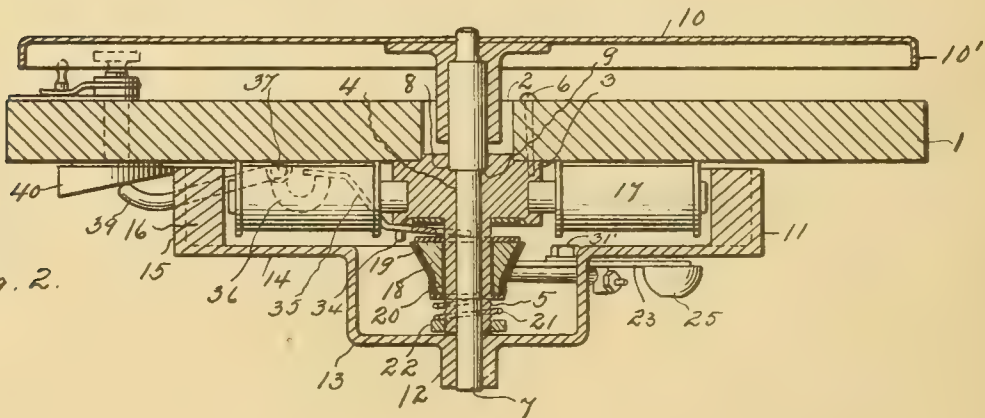


Fig. 2.

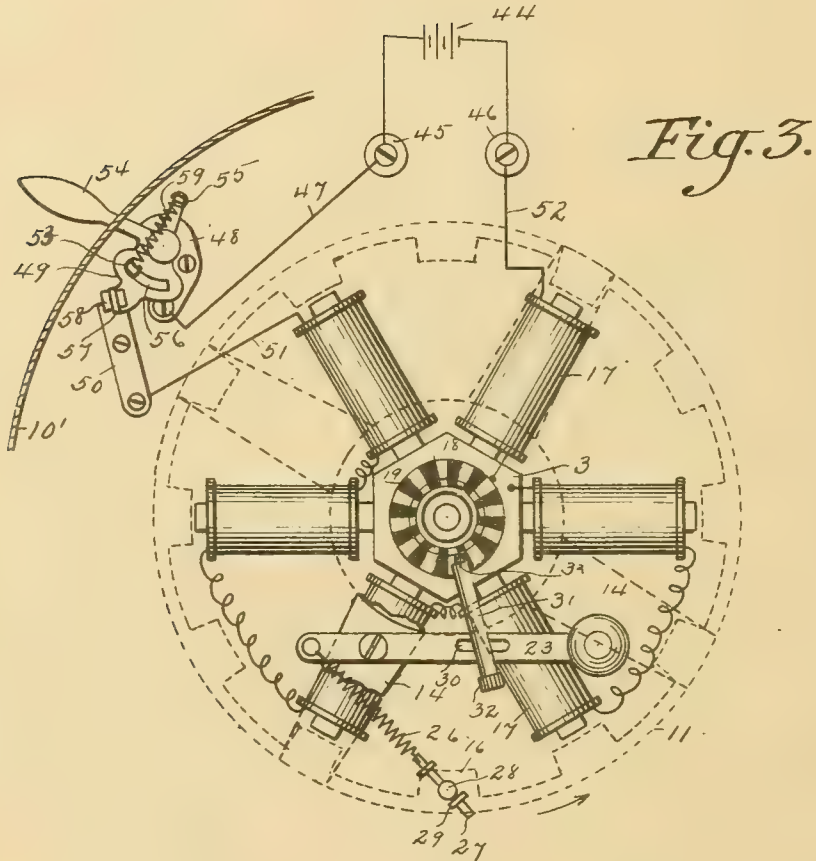


A. A. Selah Inventor
By ^{Attorney} Louis M. Sanders

H. A. SELAH.
ELECTRIC MOTOR FOR TALKING MACHINES.
APPLICATION FILED DEC. 7, 1915.

1,266,062.

Patented May 14, 1918
2 SHEETS—SHEET 2.



H. A. Selah Inventor
By *Louis M. Sanders* Attorney

UNITED STATES PATENT OFFICE.

HOWARD A. SELAH, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO ECLIPSE PHONOGRAPH CORPORATION, A CORPORATION OF DELAWARE.

ELECTRIC MOTOR FOR TALKING-MACHINES.

1,266,062.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed December 7, 1915. Serial No. 65,457.

To all whom it may concern:

Be it known that I, HOWARD A. SELAH, a citizen of the United States, and residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Electric Motors for Talking-Machines, of which the following is a specification.

In my prior application, Serial No. 50,148, I have described an improved direct current induction motor for operating the turntable of talking machines, wherein the field magnets were mounted upon a ring and their pole pieces located outside of the circumference of the turntable, which in itself formed the rotor part or induction armature of the motor. In another prior application, Ser. No. 60,473, I have shown a different form of speed regulator. In my present application I have made the motor itself as a separate and distinct element from the turntable, so that the turntable may be detached and replaced by one of a different size. The present invention also involves certain improvements in the means for regulations of speed, so that within certain limits the rate of rotation of the turntable may be accurately governed to correctly reproduce a sound record.

In the accompanying drawings forming a part of the specification—

Figure 1, is a bottom plan view of the motor.

Fig. 2, is a central cross-section of the motor and turntable.

Fig. 3, is a wiring diagram.

Similar letters of reference refer to like parts throughout the specification and drawings.

The motor board 1, is usually square, but may be made of the requisite dimensions to fit the cabinet. The board is centrally apertured as at 2, in which aperture is secured the metal supporting block 3, which latter is provided with a central aperture 4, terminating in an elongated sleeve bearing 5. This metal block is secured concentrically with the aperture 2, by means of a plurality of screws 6. Within the central aperture 4, and the sleeve bearing 5, is located the driving shaft or mandrel 7; this shaft has a shoulder bearing 8, which serves to support the mandrel 7 upon the socket bearing 9, in the upper

side of the block 3. The upper cylindrical portion of the mandrel 7 is utilized as a support for the record tablet support 10. Rigidly secured to the lower exposed end of the mandrel 7, is the induction armature 11. This armature consists of a central hub 12, the cup-shaped central member 13, the radial arms or spokes 14, the ring 15, and the inwardly projecting teeth or pole pieces 16.

As shown in Figs. 1 and 3, the central block 3 is hexagonal, and projecting radially from the hexagonal faces of this block are the field magnets 17, having the free ends of their cores extended in close proximity to the inner face of the pole pieces 16, as the latter, together with the ring 15, rotates with the shaft or mandrel 7. Mounted upon the sleeve portion 5, of the block 3, is the sliding circuit interrupter 18. This circuit interrupter is somewhat in the nature of a beveled gear with the spaces or grooves between the teeth filled with an insulating material as 19. The circuit interrupter is also insulated from the sleeve 5 by tubular insulation 20, so that it has no metallic connection with any part of the mechanism hitherto described.

As shown in Fig. 3, there are as many exposed metallic faces in this circuit interrupter as there are teeth 16 in the induction armature. The circuit interrupter 18 is held in its uppermost position by means of the spring 21, which latter surrounds the sleeve 5, and bears upon its lower end upon an insulating washer 22.

Mounted upon one of the arms 14 of the armature, is the pivotal governor bar 23, held in place by means of the screw 24, and carrying at its longer free end a governor weight 25. The shorter end of the bar 23 is connected by means of a contractile coil spring 26, with an adjusting screw 27, the latter mounted in a post 28 carried by one of the pole pieces 16. This structure is of such a character that when the nut 29 is screwed upon the adjusting rod 27, the spring 26 is put under greater tension. I provide a slot 30, about midway of the length of the longer arm of the bar 23, and in this slot is adjustably mounted the brush holder 31, carrying at its inner end a graphite brush 33 in position for contact with the face of the circuit interrupter 18.

The brush is of the usual type and is provided with the usual adjusting screw 32 to take up for the wear of the brush upon the face of the circuit interrupter.

- 5 As hitherto indicated, the circuit interrupter 18 is conical and slidable up and down upon the sleeve portion 5 of the central supporting block. The circuit interrupter is normally held in its uppermost
10 position by means of the spring 21. The tendency of the governor spring 26, is to press the brush 31 against the conical face of this circuit interrupter, but with the ring armature 11 rapidly revolving, the centrifugal force has a tendency to throw the governor ball 25 with the bar 23, outward, and thus throw the brush 31 away from the circuit interrupter. This centrifugal tendency is restrained however, by the governor
20 spring 26.

- I determine the point at which the brush leaves the circuit interrupter by means of the speed of rotation of the ring. In practice the turntable of a talking machine
25 should rotate at a rate of about 78 R. P. M. The tension of the spring 26 can be so regulated that when the armature 11 reaches a rotational rate approximately of 78 R. P. M., the brush will be at the critical point of just
30 leaving the face of the circuit interrupter through the influence of the governor ball 25, and bar 23. This may be termed a factory regulation. If, however, in actual use it is desired to vary the rate of rotation, this
35 can be done by retarding or accelerating the point at which the brush shall leave the face of the circuit interrupter. In order to accomplish this, I provide means by which the circuit interrupter 18 may be raised and
40 lowered upon the sleeve extension 5, as follows: Upon the block 3, is located the pin 34, upon which is pivoted, for vertical oscillation, the forked lever 35, the forks of which extend around the upper end of the
45 sleeve 5, and between the upper end of the circuit interrupter and the body of the block 3. The opposite free end of the lever 35 is bent upwardly toward the under side of the motor board 1, as shown in dotted
50 lines in Fig. 2, where its extremity is in position for engagement by the curved arm 36 of the rock-lever 37, the latter held in position by means of the keepers 38. The free end of this rock-lever extends laterally, as
55 shown at 39, for engagement with a cam 40. This cam is provided with a thumb adjustment 41, and an index pointer 42. From this structure, it will be readily understood that the rotation of the cam 40 through the
60 thumb piece 41 will oscillate the rock-lever 37 and simultaneously depress the lever 35 and with it the circuit interrupter 18, against the spring 21. This will cause the brush 31 to ride at a higher point upon the face of
65 the circuit interrupter; this, of course, will

place the spring 26 under a greater tension, inasmuch as it will push the bar 23 farther away from the center of rotation, and it will consequently require a greater rate of rotation in the armature 11, to overcome the
70 higher tension in the spring 26, thus caused, so that the governor ball 25 may exert sufficient centrifugal influence to pull the brush 31 away from the face of the circuit interrupter. To decrease the rate of rotation of
75 the armature 11, and consequently the rate of rotation on the turntable 10, it is only necessary to swing the cam 40 in the opposite direction so that the lever 35 may release the circuit interrupter 18 and thus permit the spring 21 to push said circuit interrupter upwardly and thereby permit the
80 brush 31 to ride upon a smaller diameter of the cone-shaped circuit interrupter. Under these circumstances, it is obvious that the spring 26, being under considerably less tension, will permit the governor ball 25 to fly away from the center of rotation at a much lower speed.

The wiring diagram is illustrated in Fig. 3. The source of electric current, as 44, may be a battery, or the electric light supply, or any desired or preferred source of current. It is connected to the two binding screws 45—46. The wiring of the device is as follows: From the post 45, wire 47 is led to the plate 48, which forms a part of the combined switch and brake mechanism. From the plate 48, the circuit continues through the pivotal switch plate 49, to the contact
100 plate 50, thence by the wire 51 in series through the several magnets 17, and as shown in Fig. 3, the circuit is grounded through the block 3, and since the mandrel or shaft 7 is in metallic contact with the
105 block 3, the circuit may continue through the mandrel 7, through the hub 12, cup 13, arm 14, and thence through the bar 23 to the brush 31, and thence intermittently to the circuit interrupter as the metallic parts thereof pass in contact with the brush. The metallic part of the circuit interrupter itself may be connected directly to the binding screw 46, but as shown in the drawings, the last one of the magnets 17 is also included
115 in this last part or fractional circuit 52. It is obvious, however, that the grounding of the circuit through the block 3 might be made at any point in the circuit or between any pair of adjacent magnets.

The brake and switch shown in Fig. 3, are of the usual type of brake mechanism with the switch added. The plate 48 is rigidly secured to the motor board 1, and is provided with an upstanding projection 53. Pivoted upon this plate is the rectangular switch lever 54, having a rearward and upward projection 55, and the arc-shaped slotted portion 56, carrying at its free end an upright projection 57, in which is secured
130

the brake shoe 58, for engagement with the flange 10' of the turntable 10. The upright stationary projection 53 is connected with the swinging upright projection 55, by means of a contractile coil spring 59.

The position of the parts, as shown, is such that the circuit is completed through the wire 47, and the wire 51, through the contact piece 50, and the lever 54. When, however, the lever 54 is swung into braking position, the circuit is broken between the contact piece 50 and the lever 54. This serves effectually to cut off the electric current and thus stop the mechanism.

In adjusting the brush 31 in the slot 30, by means of the small set bolt 31', I am able to so locate the contact of the brush 33 with the conical face of the circuit interrupter 18, as to cause said brush to be just leaving a metallic portion of said circuit interrupter as the cores of the magnets 17 are immediately adjacent to the pole pieces 16 of the armature, this, of course, breaks the electric circuit through the magnets 17, and as they are thus deenergized the magnetic attraction offers no resistance to the further rotation of the armature, but the brush 33 will again pass upon a metallic strip of the circuit interrupter as the corresponding pole pieces 16 again come into the field of attraction of the magnet cores, and thus the armature 11 is kept in rotation by a series of magnetic "pulls". By the means of adjustment above described, I am able to very accurately regulate the number of revolutions per minute of the armature, and since the magnetic pulls occur with such frequency and strength, the variation of the pressure of the stylus needle upon the surface of a record disk, offers no serious frictional drag upon the rotation of the armature.

It will thus be seen that I have accomplished all of the results set out by a structure at once simple and easy of manipulation without liability to disorder under ordinary conditions.

I claim:

1. In a talking machine motor, the combination of a stationary field magnet and a rotating induction armature, with a circuit interrupter in circuit with said magnet, a brush carried by said armature adapted to bear upon said circuit interrupter, and centrifugal means carried by said armature adapted upon a predetermined rate of revolution thereof to separate said brush from said circuit interrupter and manually operated means for varying such point of separation.

2. In an electric talking machine motor, the combination of a stationary magnet and a rotating induction armature, a circuit interrupter, a centrifugal governor carried by said armature, a brush carried by said governor adapted to bear upon said circuit in-

terrupter and to break contact therewith upon a predetermined rate of revolution of said armature, means for varying the point of such break, a source of electric supply, and a circuit including said magnets, circuit interrupter, brush and electric supply.

3. In a talking machine motor, the combination of a polygonal supporting block, having a sleeve bearing projecting downwardly and centrally therefrom, a circuit interrupter slidably mounted upon said sleeve bearing, a plurality of magnets projecting radially from the faces of said block, a mandrel mounted to rotate in said bearing, an induction armature mounted to rotate with said mandrel with the poles thereof in close proximity to the projecting cores of said magnets, a weighted spring pressed lever pivoted to said armature and adapted to swing away from its center of rotation at a predetermined rate of rotation thereof, a brush adapted to bear upon said circuit interrupter carried by said lever, means for manually shifting said circuit interrupter vertically to vary the point of separation of said brush from said circuit interrupter, and an electric circuit including said magnets, brush and circuit interrupter.

4. In a talking machine motor, the combination of a plurality of field magnets, an induction armature having a plurality of poles adapted to revolve in close proximity to the cores of said field magnets, a circuit interrupter associated with said field magnets, a brush carried by said armature adapted to bear upon said circuit interrupter, and centrifugal means carried by said armature adapted upon a predetermined rate of revolution thereof to separate said brush from said circuit interrupter, and manually operated means for shifting said circuit interrupter to vary the point of such separation.

5. In a talking machine motor, the combination of a centrally apertured polygonal supporting block having a sleeve bearing projecting centrally and downwardly therefrom, a circuit interrupter slidably mounted upon said sleeve bearing, a plurality of magnets projecting radially from the faces of said block, a record supporting mandrel mounted to rotate in said bearing, an induction armature having a plurality of inwardly directed pole pieces mounted to rotate with said mandrel with the poles thereof in close proximity to the projecting cores of said magnets, a weighted lever pivoted to said armature and tending to swing away from its center of rotation at a predetermined rate of rotation of said armature, a spring connected to said lever for resisting said tendency, a collector brush adjustably secured to said lever and adapted to bear upon said circuit interrupter, means for vertically shifting said circuit interrupter to vary the point at which said brush will

break contact with said circuit interrupter, and an electric circuit including said magnets, brush and circuit interrupter.

6. In a talking machine motor, the combination of a polygonal, centrally apertured supporting block having a sleeve bearing projecting therefrom, a cone-shaped circuit interrupter mounted upon said sleeve bearing, a plurality of magnets projecting radially from the faces of said block, a mandrel mounted to rotate in said bearing, an induction armature mounted to rotate with said mandrel with the poles thereof in close proximity to the projecting cores of said magnets, a lever pivotally mounted upon said armature and adapted to swing radially from its center of rotation at a predetermined rate of rotation of said armature, a brush adjustably secured upon said lever and adapted to bear upon said circuit interrupter, means for vertically shifting said circuit interrupter to vary the point at which such brush will break contact with said circuit interrupter, and an electric circuit including said magnets, brush and circuit interrupter.

7. In a talking machine motor, the combination of a polygonal, centrally apertured supporting block having a sleeve bearing projecting centrally and downwardly therefrom, a cone-shaped circuit interrupter mounted upon said sleeve bearing and provided with a plurality of metallic faces upon its cone surface, a mandrel mounted to rotate in said bearing, an induction armature provided with a plurality of inwardly directed pole pieces, said armature being mounted to rotate with said mandrel with its poles in close proximity with the poles of said magnets, a weighted spring pressed lever pivoted upon said armature and adapted to swing radially away from its center of rotation at a predetermined rate of rotation thereof, a brush adapted to bear upon said circuit interrupter, said brush being adjustably mounted upon said lever, means for manually raising and lowering said circuit interrupter to vary the point at which said lever will swing said brush free from said circuit interrupter, and an electric circuit including said magnets, brush and circuit interrupter.

8. In a talking machine motor, the combination of a polygonal, centrally apertured supporting block having a sleeve bearing projecting centrally and downwardly therefrom, a cone-shaped circuit interrupter mounted upon said sleeve bearing for vertical reciprocation, a plurality of magnets projecting radially from the faces of said block, a mandrel mounted to ro-

tate in said bearing, an armature secured to said mandrel, said armature having a plurality of inwardly directed pole pieces adapted to rotate in close proximity with the projected poles of said magnets, a lever pivoted upon said armature to swing toward and away from said circuit interrupter, a spring connected to said lever and armature to give said lever a normal bias toward said circuit interrupter, a brush adapted to bear upon said circuit interrupter, said brush being adjustably secured to said lever, manually operated means for vertically reciprocating said circuit interrupter to vary the bias of said lever, and an electric circuit including said magnets, brush and circuit interrupter.

9. In a talking machine motor, the combination of a set of radially directed stationary field magnets, a cone-shaped circuit interrupter centrally mounted to reciprocate relative to said magnets, an induction armature having a plurality of inwardly directed pole pieces mounted to rotate with said pole pieces in close proximity to the cores of said radially directed field magnets, a combined centrifugal governor and brush carried by said armature and adapted to bear upon said circuit interrupter at a normal rate of rotation of said armature and to swing away from said circuit interrupter at a predetermined maximum rate of rotation of said armature, manually operated means for reciprocating said circuit interrupter to vary the point of break with brush, and an electric circuit including said magnets, brush and circuit interrupter.

10. In a talking machine motor, the combination of a plurality of radially directed, centrally supported field magnets, a sliding circuit interrupter mounted to reciprocate in the axis of said magnets, an induction armature having a plurality of inwardly directed pole pieces adapted to rotate with said pole pieces in close proximity to the radial poles of said projecting magnets, a combined governor and brush mounted upon said armature said brush adapted to bear upon the surface of said circuit interrupter, said governor adapted to break said contact between said brush and circuit interrupter upon a predetermined rate of rotation of said armature, means for manually reciprocating said circuit interrupter to vary the point of such break, and an electric circuit including said magnets, brush and circuit interrupter.

In testimony whereof, I have hereunto set my hand and affixed my seal this 16 day of November, 1915.

HOWARD A. SELAH.

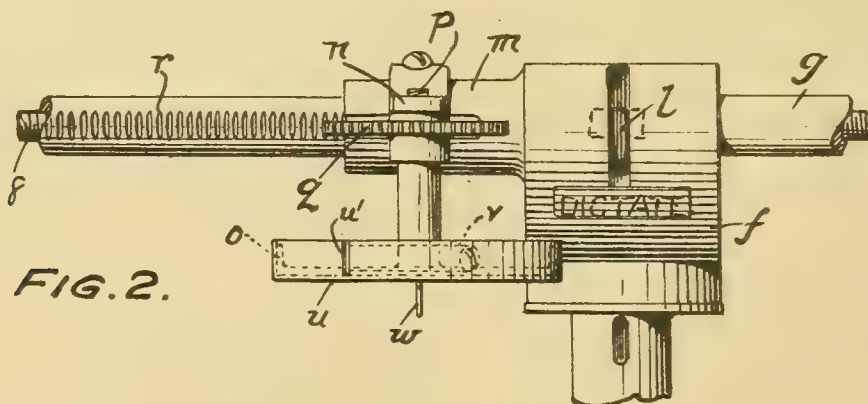
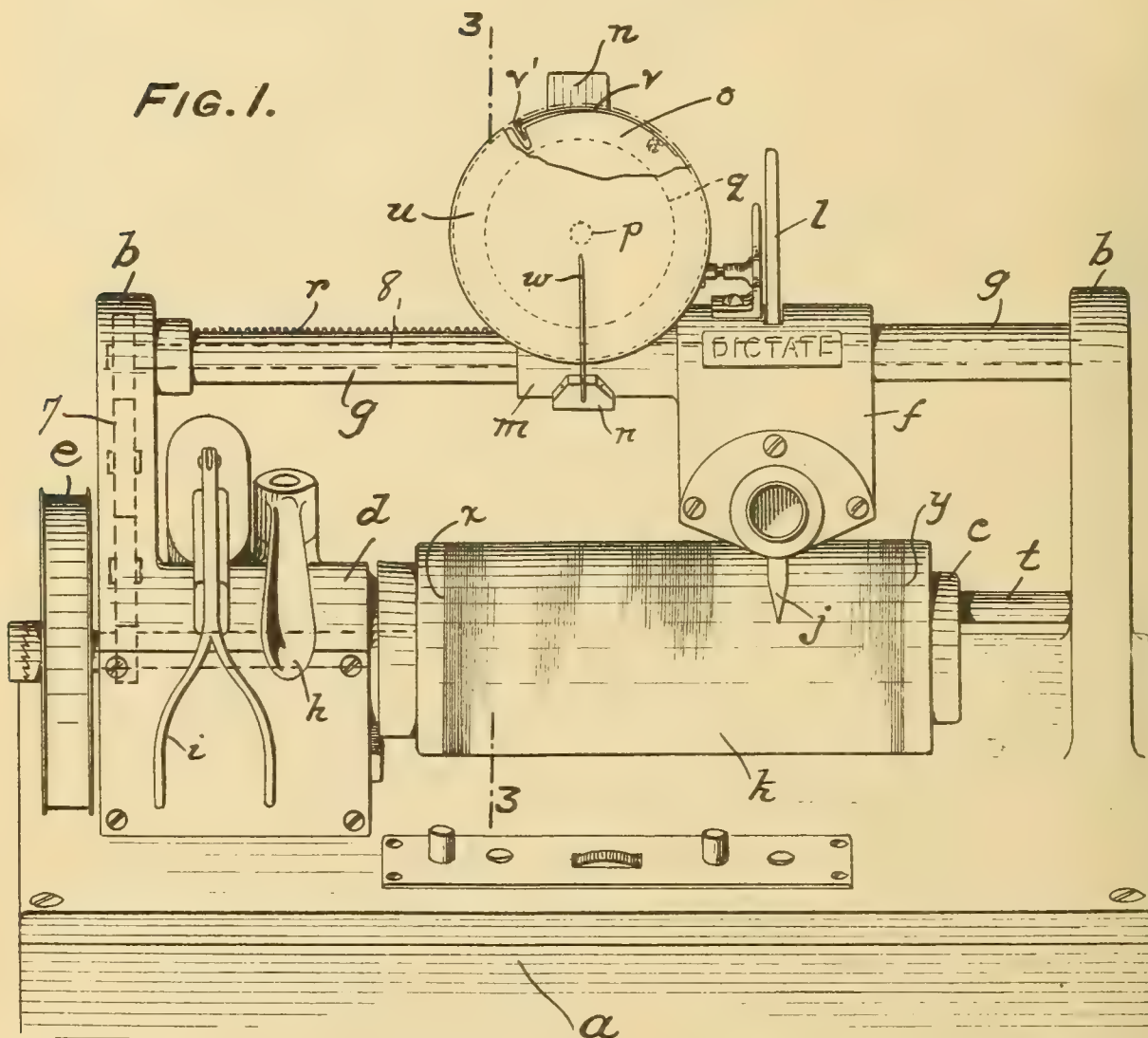
CORRECTION DEVOCE FOR TALKING MACHINES.

1,266,065 ----- S. Shelly,
Filed June 29, 1917,
Patented May 14, 1918.

S. SHELLY.
CORRECTION DEVICE FOR TALKING MACHINES.
APPLICATION FILED JUNE 29, 1917.

1,266,065.

Patented May 14, 1918.
2 SHEETS—SHEET 1.



WITNESS:

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INVENTOR

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S. SHELLY.
CORRECTION DEVICE FOR TALKING MACHINES.
APPLICATION FILED JUNE 29, 1917.

1,266,065.

Patented May 14, 1918.
2 SHEETS—SHEET 2.

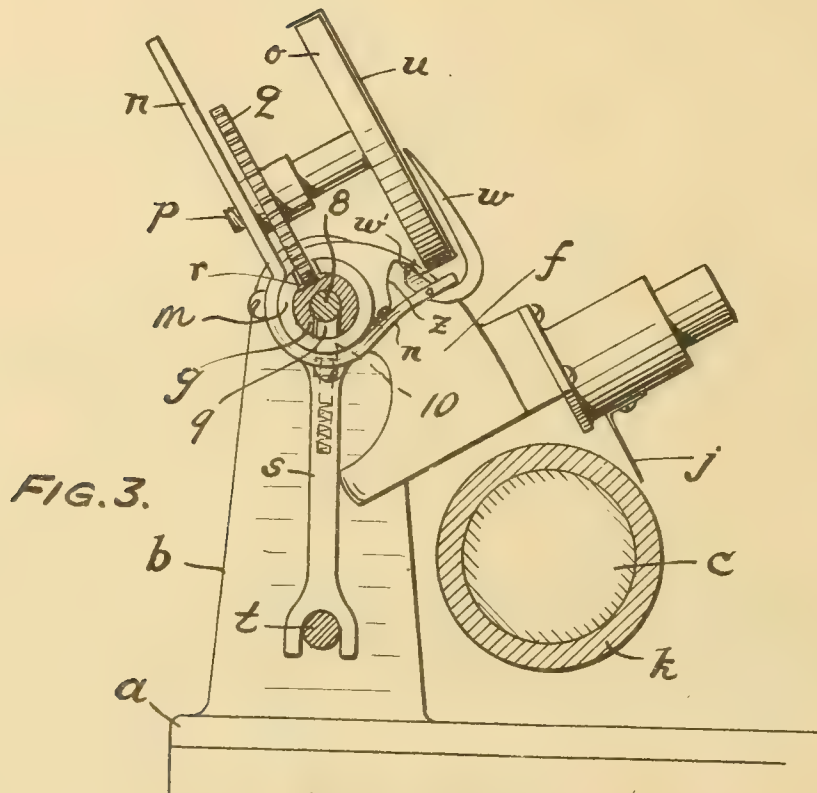


FIG. 3.

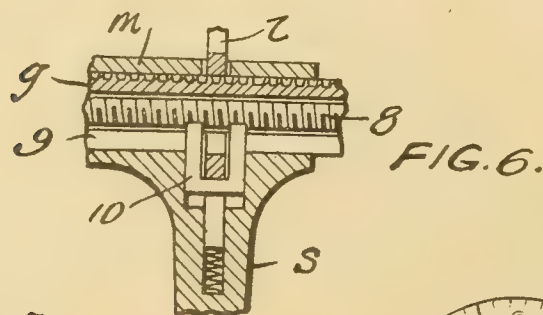


FIG. 6.

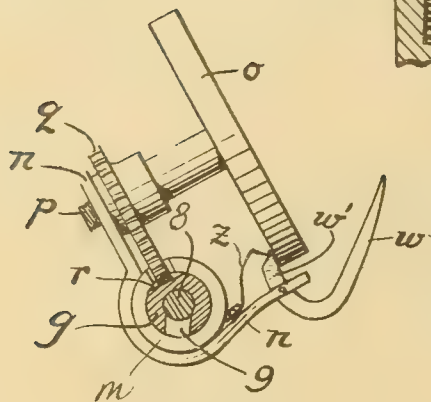


FIG. 4.

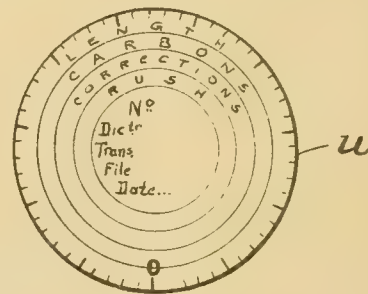


FIG. 5.

WITNESS:

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ATTORNEY.

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CORRECTION DEVICE FOR TALKING-MACHINES.

1,266,065.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed June 29, 1917. Serial No. 177,621.

To all whom it may concern:

Be it known that I, SAMUEL SHELLY, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Correction Devices for Talking-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to talking machines of the character used for dictation purposes and has for its special object the provision of simplified means for imparting information to the transcriber. Devices adapted to this purpose are known in the art. Thus it is known to provide a rotary disk operable by the traveling sound box to turn on its axis once during the travel of the sound box from one end to the other of the cylindrical record. This disk is provided with a scale and other characters, upon which, at any given point, a mark may be made which, by reference to the scale and the particular other character registering with the mark, will inform the transcriber that, at a corresponding point in the length of the record, something special must be done; for example, that a mistake has been made, or that a particular communication should be rushed, or that a certain number of carbon copies should be prepared.

My invention constitutes an improvement upon this type of correction and information device. One objection to the known devices is that their construction is more or less complicated. One of the objects of my invention is to simplify the construction so as to render the use of the device commercially practicable. Another and serious objection to the known devices is their lack of accuracy due to slight differences between the machine used for dictation and the machine used for transcribing. Ordinarily, as is well known, records are transcribed from a different machine from that upon which they are dictated. The two machines, except in minor features, are essential duplicates. After a record is made on the first machine it is removed from the cylindrical holder thereof and slipped onto the cylindrical holder of the second machine, the indicator disk being also transferred from one machine to the other. Due to the lack of ex-

act correspondence in the dimensions of the two holders (which are tapered to facilitate the application of the record) or due to a failure on the part either of the dictator or transcriber to slip the record onto its holder to precisely the same extent, the indicator registers falsely, which is a source of confusion and error. One of the important objects of my invention is to obviate this difficulty. Another objection to the known device is that special disks (or in another type of dictating machine, special strips) must be provided, which adds to the equipment required. To avoid this, another object of my invention is to so construct the machine as to enable the cover of the box containing the record to be utilized as the indicator, thus dispensing entirely with the necessity of adding anything to the equipment required for operating machines devoid of any correction or information device.

In describing a preferred embodiment of my invention, I shall show how it is applied to a well known type of machine and will describe only such parts of the latter as more directly cooperate with my improved attachment. In the drawings, which illustrate such a preferred embodiment,—

Figure 1 is a front view of a portion of a talking machine embodying my invention,

Fig. 2 is a partial top view of same.

Fig. 3 is a cross sectional view on line 3—3 of Fig. 1.

Fig. 4 is a section like Fig. 3 showing parts in another position.

Fig. 5 is a detail face view of the indicator.

Fig. 6 is a sectional view showing means by which the sound box is moved.

The body of the machine *a* carries the usual upper-works mounted on the standards or brackets *b*. These consist primarily of the tapered record holder *c* supported in the bearing *d* and rotated by means of the pulley *e*, and of the sound box *f* slidable upon the bar *g*. I have shown the usual ejector handle *h* and the transmitter hook switch *i*.

A pointer *j* depends from the sound box *f* to give the eye of the operator the position of the needle of the instrument longitudinally of the record *k*.

The sound box *f* is moved, by old and well known means, along bar *g* from left to right, beginning with the needle and pointer *j* in the first turn *x* of the spiral groove in the

record *k* and continuing until they run past the last turn *y* thereof. Pulley *e*, by means of gear train 7, rotates the feed screw 8 for moving the sound box. The feed screw turns centrally in the stationary bar *g*, along the bottom of which runs a slot 9. A plunger 10 is mounted in the sound box carriage and is spring-pressed up through slot 9 against the feed screw. The top end of this plunger contains thread portions which mesh with the threads on the feed screw, thus acting as a nut to move the parts carrying the sound box along bar *g* when the feed screw is turned. By moving lever *l* the needle of the instrument is raised from the record and the sound box *f* disconnected from its driving means, so as to be readily slidable by hand along bar *g*. An arm *s* projects downward from the sound box *f*, and slides along a rod *t*, parallel to bar *g*. This serves to maintain the sound box in an upright position and prevents its turning about bar *g*.

Thus far nothing new has been described, but merely the well known parts of a certain form of phonograph used for dictating purposes. The object of my invention is to locate any desired points in the record groove between the points *x* and *y*, a longitudinal distance of approximately $5\frac{1}{2}$ inches, and consisting of many hundreds of turns of the spiral groove.

The sound box *f* has the sleeve extension *m*, upon which is mounted a bracket *n* for carrying my indicator device. This consists of a holder *o* upon a stud *p* projecting from bracket *n*. The hub of holder *o* also carries a gear wheel *q* meshing with teeth *r* cut upon the upper side of bar *g*. The sleeve *m* is cut away to allow gear *q* to get into mesh with the teeth *r*.

Thus the movement of the sound box along bar *g* turns gear *q*, and therewith holder *o*. Moreover, gear *q* is of such diameter as to turn one complete revolution in the before mentioned length of travel of $5\frac{1}{2}$ inches of the standard records, the indicator holder *o* therefore doing likewise.

Upon this holder is placed an indicator *u* which, as before stated, is, or may be, the cover of the box containing the record. That is, it is of circular form with a flange or rim on the general cap-shape of the box cover. This indicator is slipped over the holder *o*, a spring *r* in the rim of the latter holding the indicator from inadvertently turning thereon after being set.

A pointer *w*, extending in front of the indicator, is pivoted below to an extension from bracket *p*, and carries a tail *w'* whereby it may be opened and closed as shown in Figs. 3 and 4. When an indicator is slipped on the holder, as shown in Fig. 3, its rim or flange strikes and pushes tail *w'* backward, bringing pointer *w* up in front of the indicator in its active position. Prefer-

ably a spring *z* is arranged to snap the pointer *w* beyond the position to which it is pushed by the flanged rim of the indicator, so that the pointer will be against the face of the indicator. The free end of the spring is bent into such shape that when the indicator is withdrawn the end of the tail piece of the pointer will raise the bent end of the spring so that the spring will be ineffective to return the pointer to indicating position and the pointer will remain in the position shown in Fig. 4; although, if desired, the pointer may be moved by hand slightly toward its closed position, the spring then completing its return to the position shown in Fig. 4.

The circular face of the indicator carries a scale on its edge corresponding to the $5\frac{1}{2}$ inches length of record, and within this are concentric annular rings (see Fig. 5) upon which can be made marks, as before described, calling attention to the particular sections of the record corresponding to the positions of the marks upon the above mentioned scale.

The indicator is placed upon the holder *o* so that a certain point on its periphery, marked zero, is directly in line with pointer *n* when the needle and pointer *j* are in the first turn *x* of the record groove. Thereafter, as the needle moves along and the indicator *u* turns, the marks are made thereon in the proper annular space always in line with pointer *w*.

When the record is to be read off, the indicator is placed upon the holder of the transcribing machine, in the same way: with slot *u'* registering with the end *v'* of spring *v*. Then the sound box of the transcribing machine is run back so that *j* covers line *x* and the needle of the instrument takes up the first sound of the record. In this position if the zero, as marked above, does not fall directly in line with pointer *w*, the indicator *u* may be turned slightly by hand until it does so, making the correction easily, and insuring that the scale upon the indicator corresponds with the record, the same on the transcribing machine as on the machine it was made on.

To insure that the pointer shall register accurately with zero on the indicator when the latter is applied to its holder on the dictating machine, without any special effort being made by the user to effect the alignment, the flange of the indicator is notched at *u'*. After the indicator is applied to the holder it is turned thereon until the notched part of the indicator engages the slightly projecting end *v'* of the spring *v*. The notch is so positioned that in this position of the indicator the pointer accurately registers with zero. On the transcribing machine, however, the edge of spring does not project so as to engage the notch, and there

is nothing to prevent the indicator being turned, as hereinbefore described, to effect the alinement of the pointer with zero.

Having now fully described my invention, what I desire to claim and protect by Letters Patent is:

1. In a device of the character described, the combination with the record holder and the traveling sound box, of a rotatable indicator holder, and means to bodily move both the sound box and the indicator holder longitudinally of the record holder and to rotate the indicator holder synchronously therewith.

2. In a device of the character described, the combination with the record holder and the traveling sound box, of a traveling bearing, an indicator holder rotatable in said bearing, means to bodily move in unison both the sound box and said bearing, gearing on the axis of the indicator holder, and a rack engaging said gearing, whereby the indicator holder rotates as it bodily moves.

3. In a device of the character described, the combination with the record holder and the traveling sound box, of a rotatable circular indicator holder, means to bodily move the sound box and synchronously therewith to rotate the indicator holder, a circular indicator of comparatively rigid material, and a peripheral flange on the indicator adapted to engage the periphery of the circular indicator holder.

4. In a device of the character described, the combination with the record holder and the traveling sound box, of a rotatable circular indicator holder, means to bodily move the sound box and synchronously therewith to rotate the indicator holder, a pointer in coöperative relation with the indicator holder, a removable and replaceable indicator, and means adapting the indicator to be turned on its holder to synchronize the indicator and pointer with the record to compensate for variations in the longitudinal position of the record relatively to its holder.

5. In a device of the character described, the combination with the record holder and the traveling sound box, of a rotatable circular indicator holder, means to bodily move the sound box and synchronously therewith to rotate the indicator holder, a removable and replaceable indicator turnable on the axis of the holder, and yielding securing means between the indicator and its holder permitting the indicator to be manually turned relatively to its holder but adapted to hold the indicator on its holder in any position to which it is turned.

6. In a device of the character described, the combination with the record holder and the traveling sound box, of a rotatable circular indicator holder having a notch in its periphery, means to bodily move the sound

box and synchronously therewith to rotate the indicator holder, a circular indicator, a peripheral flange on the indicator, and a spring secured at one end to the periphery of the indicator holder, its other end engaging said notch, said spring and flange co-operating to permit the indicator to be turned on the axis of its holder and to hold the indicator in any position to which it may be turned.

7. In a device of the character described, the combination with the record holder and its traveling sound box, of a rotatable indicator holder, means to synchronously bodily move the sound box and rotate the indicator holder, a pivoted pointer adapted to swing over and toward the indicator holder, a circular indicator, and a peripheral flange on the indicator adapted, when the indicator is applied to its holder, to engage said pointer and swing it toward the face of the indicator.

8. In a device of the character described, the combination with the record holder and the traveling sound box, of a rotatable circular indicator holder, means to bodily move both the sound box and the indicator holder longitudinally of the record holder and to rotate the indicator holder synchronously therewith, a circular indicator, a peripheral flange on the indicator, and yielding securing means between said flange and the indicator holder permitting the indicator to be manually turned relatively to its holder but adapted to hold the indicator on its holder in any position to which it is turned.

9. In a device of the character described, the combination with the record holder and the traveling sound box, of a traveling bearing connected with the sound box so as to travel therewith, an indicator holder rotatable in said bearing, means to bodily move the sound box and synchronously therewith to rotate the indicator holder, a pointer pivotally mounted on said bearing, and a flanged indicator adapted to be applied to the indicator holder and thereby engage the pointer and swing it toward the face of the indicator.

10. In a device of the character described, the combination with the record holder and the traveling sound box, of a rotatable circular indicator holder, means to bodily move the sound box and synchronously therewith to rotate the indicator holder, a spring secured to the indicator holder, and a circular indicator and a peripheral flange thereon adapted to engage said spring, said flange being notched to engage said spring and limit the turning movement of the indicator on its holder.

11. In a device of the character described, the combination with the record holder and its traveling sound box, of a rotatable indicator holder, means to synchronously bod-

ily move the sound box and rotate the indicator holder, a pivoted pointer adapted to swing over and toward the indicator holder, a circular indicator, a peripheral flange on the indicator adapted, when the indicator is applied to its holder, to engage said pointer and swing it toward the face of the indicator, and a spring tending, when the

pointer is so swung toward the face of the indicator, to swing the pointer in the same direction beyond the point to which it would be movable by the flanged indicator. 10

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 27th day of June, 1917.

SAMUEL SHELLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

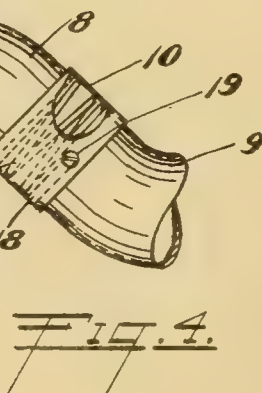
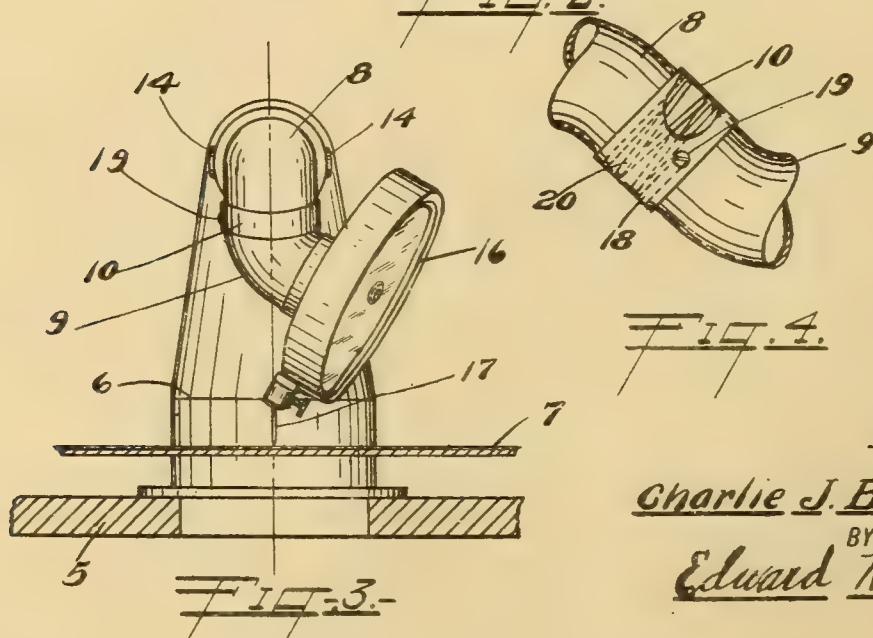
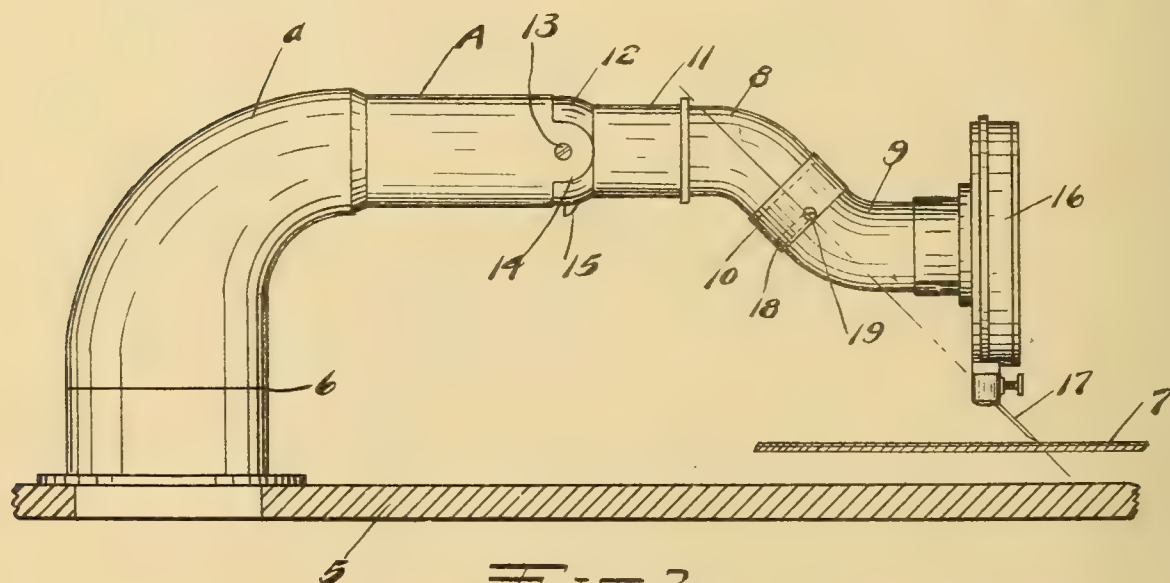
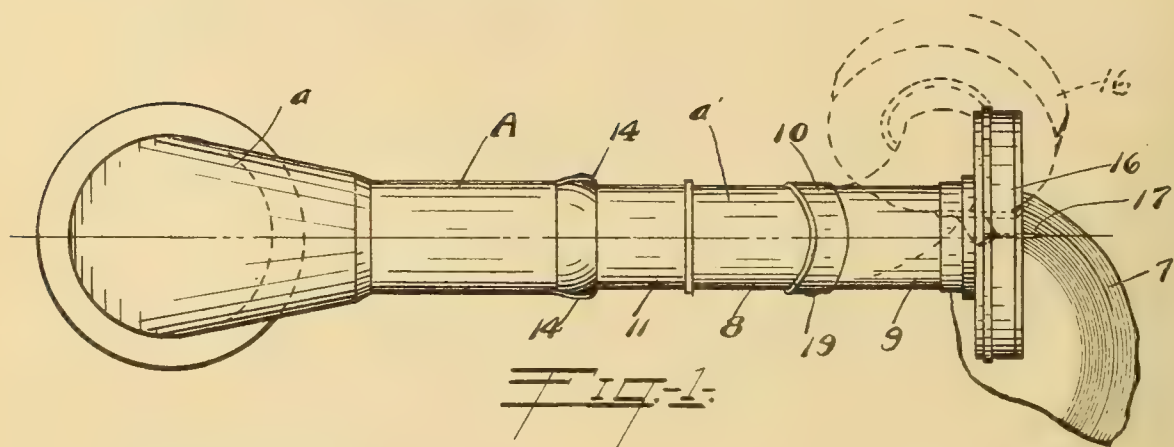
TONE ARM FOR TALKING MACHINES.

1,266,096 ----- C. J. Bousfield,
 Filed May 22, 1917,
 Patented May 14, 1918.

C. J. BOUSFIELD.
TONE ARM FOR TALKING MACHINES.
APPLICATION FILED MAY 22, 1917.

1,266,096.

Patented May 14, 1918.



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TONE-ARM FOR TALKING-MACHINES.

1,266,096.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed May 22, 1917. Serial No. 170,206.

To all whom it may concern:

Be it known that I, CHARLIE J. BOUSFIELD, a citizen of the United States of America, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Tone-Arms for Talking-Machines, of which the following is a specification.

This invention relates to tone arms for talking machines.

One object of the invention is to provide a tone arm so constructed that it may be used to reproduce sounds from either of the two types of records differing in the character of the sound undulations of the record groove. This I accomplish by providing a sound box which is arranged to assume either of two operative positions, in one of which the stylus of the sound box will co-operate with a record of the vertically undulating type to reproduce the recorded sounds, and in the other of which it will co-operate with a record of the laterally undulating type.

Another object resides in the provision of a tone arm of the nature stated, embodying among other characteristics, means whereby the stylus assumes one playing position at all times, taking the groove of either the vertical undulating or lateral undulating grooved type of record on a direct line through the center of the tone arm and always at the same angle with relation to the sound box, say for instance, an angle of approximately forty five degrees.

A still further object is to provide a talking machine having a tone arm constructed so that it may be adjusted to reproduce sounds from either the vertical undulating grooved type of records or the lateral undulating grooved type of records without adjusting or shifting the stylus from a normal playing position on a line extending through the center or longitudinal axis of the tone arm, or in other words, providing a tone arm constructed whereby upon the substitution of one of the two types of records for the other, the stylus will assume the same playing position with relation to the tone arm when playing either record.

It is still further designed to provide a talking machine with a tone arm which may be adjusted to present the stylus of the sound box in the same playing position with relation to the sound box and the tone arm

upon substitution of either of the two types of records referred to for the other, without adjusting the stylus with relation to the sound box and without substituting one sound box for another and without adjusting an automatic stop device if the same be used on the machine.

With the above and other objects in view the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims appended hereto, it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Figure 1 is a top plan view of the invention, illustrating the reproducer in two different operative positions.

Fig. 2 is a side elevation.

Fig. 3 is a front elevation.

Fig. 4 is a fragmentary detail view, partly in section, showing a swiveled connection between members of the tone arm.

Referring now more particularly to the accompanying drawing, the character 5 indicates a part of a talking machine cabinet on which is mounted a support 6 for the tone arm indicated generally by the character A which has swiveled connection with said support, the character 7 indicating a portion of a record.

The tone arm A is preferably composed of inner and outer portions a and a' , the former being preferably in the form of an elbow and the latter of goose-neck form composed of sections 8 and 9 connected by a sleeve 10. The inner section 8 is rigidly connected to a sleeve 10 provided at its inner end with means 12 adapted to be pivotally connected by suitable pivots 13 between ears 14 at the outer end of the elbow a , providing for a ball and socket connection between said elbow a and the sleeve 10 of said section 8, downward movement of the sleeve 10 being limited by a stop 15. The outer end of the section 9 of the goose-neck portion a' of the tone arm is connected in any suitable manner with a sound box 16 of any suitable construction provided with a needle or stylus 17.

The sleeve 10 between the goose-neck sections 8 and 9 is provided with a pin 19 which operates in a slot 18 formed in the outer goose-neck section 9, the latter being 5 rotatable in said sleeve 10 to adjust the same and the sound box so as to position the stylus 17 for action in hill or dale and laterally undulated grooves of the record. The inner goose-neck section 8 is fixed to 10 said sleeve 10.

A spring 20 is located in the sleeve 10 and adapted to exert tension against the inner end of the outer goose-neck section 9 to hold the latter in adjusted positions with rela- 15 tion to the sleeve.

When the tone arm is positioned as illustrated in Fig. 2, and it is desired to substitute for the record 7, a record of a different type, the tone arm is positioned as 20 shown in Fig. 3, and vice versa, according to whether a change is desired made from a hill and dale record or a record provided with lateral undulations in the side walls of the groove. This change in the adjustment 25 or positioning of the sound box so as to enable the needle or stylus to operate in the various types of record grooves is accomplished by adjusting the outer goose-neck section 9 in the sleeve 10 which connects the 30 goose-neck sections 8 and 9 together. As has been stated, the spring 20, located in the sleeve 10, exerts such pressure against the outer goose-neck section 9 as to hold the goose-neck section 9 in adjusted turned 35 positions with relation to the goose-neck section 8, the goose-neck section 9 being prevented from falling out of the sleeve 10 by virtue of the slot and pin connection 18—19 while this slot and pin connection guides 40 the rotative movement of the outer goose-neck section 9. In either or any adjusted position of the goose-neck section 9, to adjust the position of the sound box, the stylus does not have to be independently adjusted 45 but is disposed always in exactly the same position, that is, at an angle of substantially forty-five degrees with relation to the sound box and always on a line through the center of the tone arm.

50 It will thus be clearly understood that the stylus itself never needs adjusting but

it is the sound box which is adjusted, the stylus being always in proper playing position in either position of the sound box, this being due to the fact that the tone arm 55 members 8 and 9 are arranged at an angle of forty-five degrees with relation to each other (reversed of course), while the stylus or needle is also at an angle of substantially forty-five degrees and in center line with the 60 longitudinal axis of the tone arm members 8 and 9.

The fact that the stylus or needle has the same position with relation to the tone arm in playing both types of records has for one 65 advantage the fact that in a machine where an automatic stop is used, the latter does not have to be abnormally adjusted at the time the change is made from one type of record to another. Moreover, the fact that 70 the needle is arranged at an angle to the sound box in either playing position, the vibrations on the sound box are more distinct than those resulting from disposing the needle or stylus in the plane of or in the 75 same angular relation as the sound box. The result is that the vibration of the reproducer is more distinct and clear, rendering a fuller volume and a clearer tone. The 80 curvature of the goose-neck sections 8 and 9 is such that the sound waves are not hindered by any sharp turns or obstructions, which is an essential feature with respect to the accuracy of reproduction.

What I claim is: 85

1. In a talking machine, a tone arm comprising reversely curved sections connected by means of a swivel joint, and an expansible helical spring interposed between the jointed ends of the sections to maintain a 90 tension thereon to hold them in the required adjusted position.

2. In a talking machine, a tone arm comprising reversely curved sections, a sleeve at the end of one section and receiving the 95 end of the other section, a pin and slot connection between the sleeve and one of said sections, and an expansible helical spring disposed within the sleeve and between the ends of the sections. 100

In testimony whereof I affix my signature.

CHARLIE J. BOUSFIELD.

PHONOGRAPH CABINET LIBRARY TABLE.

1,266,169 ----- H. Siskin,
Filed Sept. 27, 1917,
Patented May 14, 1918.

H. SISKIN.
 PHONOGRAPH CABINET LIBRARY TABLE.
 APPLICATION FILED SEPT. 27, 1917.

1,266,169.

Patented May 14, 1918.

FIG. 1.

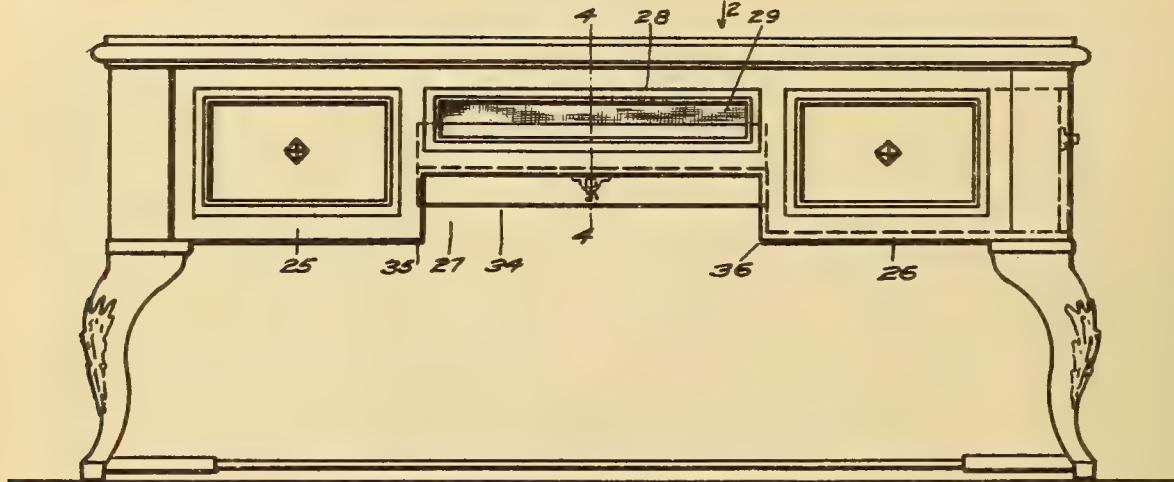


FIG. 2.

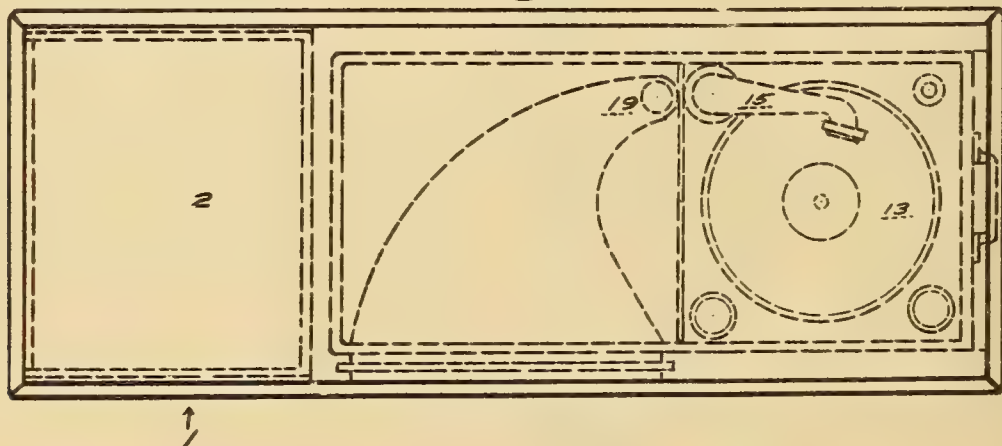


FIG. 3.

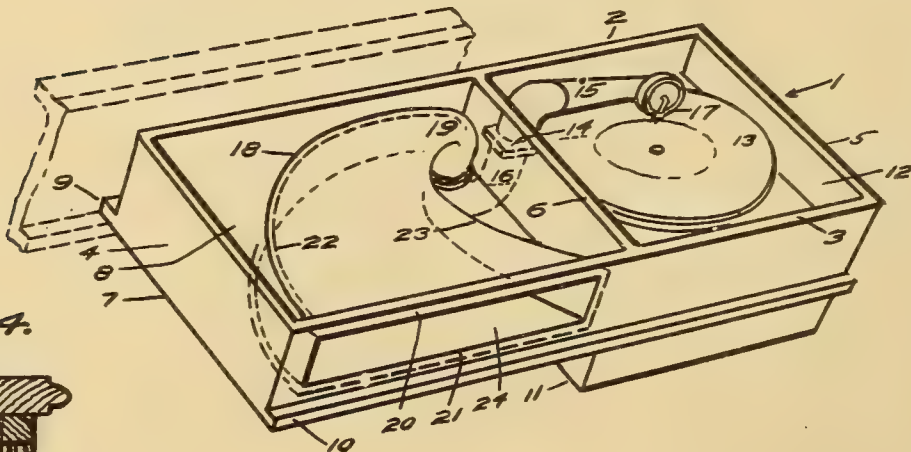
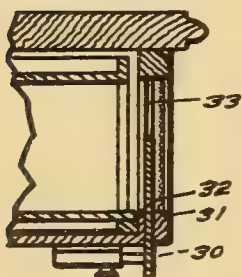


FIG. 4.



INVENTOR
HARRY SISKIN
 BY *Hazard and Miller*
 ATTORNEYS

UNITED STATES PATENT OFFICE.

HARRY SISKIN, OF LOS ANGELES, CALIFORNIA.

PHONOGRAPH-CABINET LIBRARY-TABLE.

1,266,169.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed September 27, 1917. Serial No. 193,519.

To all whom it may concern:

Be it known that I, HARRY SISKIN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Phonograph-Cabinet Library-Tables, of which the following is a specification.

My object is to make a phonograph cabinet in the form of a library table without disfiguring the table and so that the phonograph construction will be entirely concealed and at the same time be readily accessible without disturbing anything upon the table.

Figure 1 is a front elevation of a phonograph cabinet library table constructed in accordance with the principles of my invention, as seen looking in the direction indicated by the arrow —1— in Fig. 2.

Fig. 2 is a top plan view of the library table showing the phonograph construction in dotted lines.

Fig. 3 is a perspective showing the major portion of the phonograph construction mounted in a drawer, the drawer being withdrawn from the table.

Fig. 4 is a fragmentary vertical cross-section on the line 4—4 of Fig. 1.

The drawer 1 comprises vertical sides 2 and 3, vertical ends 4 and 5 connecting the ends of the sides, a partition 6 intermediate of the ends, a bottom 7 for the horn chamber 8 between the end 4 and partition 6, the slides 9 and 10 projecting outwardly from the sides 2 and 3 on a level with the bottom 7, and the drop bottom 11 for the phonograph chamber 12 between the end 5 and the partition 6; the sides 2 and 3, the end 5, and the partition 6 extending below the slides 9 and 10 to support the bottom 11.

The phonograph 13 is mounted in the chamber 12. The bracket 14 is mounted in the chamber 12 against the partition 6 so as to support the tone-arm 15. A tubular return bend 16 communicates with the tone-arm 15 through the bracket 14 and leads downwardly inside of the partition 6 through the partition into the chamber 8 and upwardly. Of course, the tone-arm 15 is mounted in the bracket 14 in the usual manner to allow the free end of the tone-arm carrying the needle 17 to swing over the disk of the phonograph. The horn 18 connects at its receiving end 19 to the return bend 16. The horn 18 has flat upper and lower sides 20 and 21 and vertical sides 22 and 23, the

vertical sides converging upon a curved plane from the outlet opening 24 to the inlet end 19. The horn thus shaped and constructed practically fills the chamber 8 and an opening is formed through the side 3 in which the discharge end of the horn having the opening 24 is mounted flush.

The drawer and phonograph construction thus incorporated with the drawer is inserted into a slide-way from the right-hand end of the table shown in Figs. 1 and 2 and the drawer occupies substantially two-thirds of the length of the table, as shown in dotted lines in Fig. 2.

Rigid panels 25 and 26 extend toward the center from the ends of the table leaving a space 27 at the center of the table and extending both ways from the center equal to about one-third of the length of the table. A panel frame 28 is mounted in the upper part of the space 27 between the panels 25 and 26 and a sound screen 29 is fixed in this frame, said screen being formed by a sheet of silk or other suitable sound conducting material stretched taut in the frame, and this sound screen 29 is directly in front of the discharge opening 24 of the horn 18. A slide 30 is mounted to slide up and down behind the panel frame 28, and a spring-pressed bolt 31 is mounted upon the bottom of the slide-way 32 and presses against the back side of the slide 30 so as to hold the slide in any adjusted position. The slide may be moved upwardly to completely close the opening behind the sound screen or it may be moved downwardly to provide any desired size of sound passage 33. When the slide 30 is down to completely open the passage through the sound screen 29 it completes the front of the table, its lower edge 34 extending straight across from the corners 35 and 36 of the panels 25 and 26.

It is obvious that the phonograph construction is completely concealed in the cabinet and that the cabinet presents the appearance of a library table and nothing else; that the phonograph mechanism mounted in the drawer 1 is readily accessible by pulling out the drawer; and that the sound opening through the screen 29 may be readily and tightly closed or opened to any desired extent without in any way exposing the phonograph or disfiguring the table. The whole apparatus is readily handled without disturbing anything that may be upon the table top.

Various changes in the details of construction may be made without departing from the spirit of my invention as set up in the following claims.

5 I claim:

1. In a phonograph cabinet library table, a drawer comprising vertical sides, vertical ends, a partition connecting the sides intermediate of the ends and forming a horn chamber on one side of the partition and a phonograph chamber on the other side of the partition, a bottom for the horn chamber, a drop bottom for the phonograph chamber, and slides projecting outwardly from the sides on a level with the bottom of the horn chamber.

2. In a phonograph cabinet library table, a flat table top, rigid panels below the top and extending toward the center from the ends, a panel frame extending downwardly from the top between the inner ends of the panels, a sound screen fixed in the panel frame, and a slide-way extending from one end below the top; and a drawer comprising vertical sides, vertical ends, a partition connecting the sides intermediate of the ends and forming a horn chamber on one side of the partition and a phonograph chamber on the other side of the partition, a bottom for the horn chamber, a drop bottom for the phonograph chamber, and slides

projecting outwardly from the sides on a level with the bottom of the horn chamber and adapted to fit in the slide-way of the table. 35

3. In a phonograph cabinet library table, a flat table top, rigid panels below the top and extending toward the center from the ends, a panel frame extending downwardly from the top between the inner ends of the panels, a sound screen fixed in the panel frame, and a slide-way extending from one end below the top; a drawer comprising vertical sides, vertical ends, a partition connecting the sides intermediate of the ends and forming a horn chamber on one side of the partition and a phonograph chamber on the other side of the partition, a bottom for the horn chamber, a drop bottom for the phonograph chamber, and slides projecting outwardly from the sides on a level with the bottom of the horn chamber and adapted to fit in the slide-way of the table; a slide mounted to move up and down behind the panel frame, and a spring-pressed bolt mounted upon a rigid part and pressing against the back side of the slide to hold the slide in an adjusted position. 40 45 50 55

In testimony whereof I have signed my name to this specification.

HARRY SISKIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

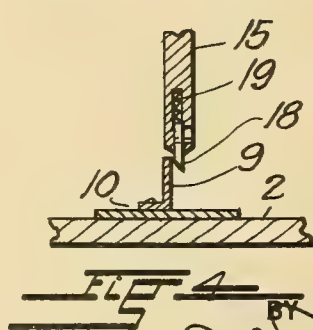
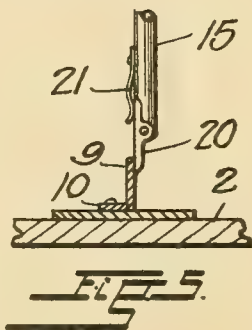
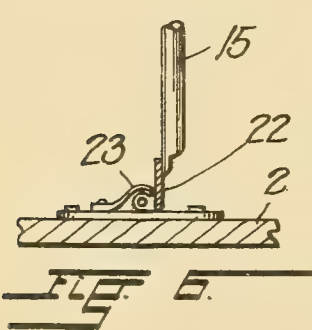
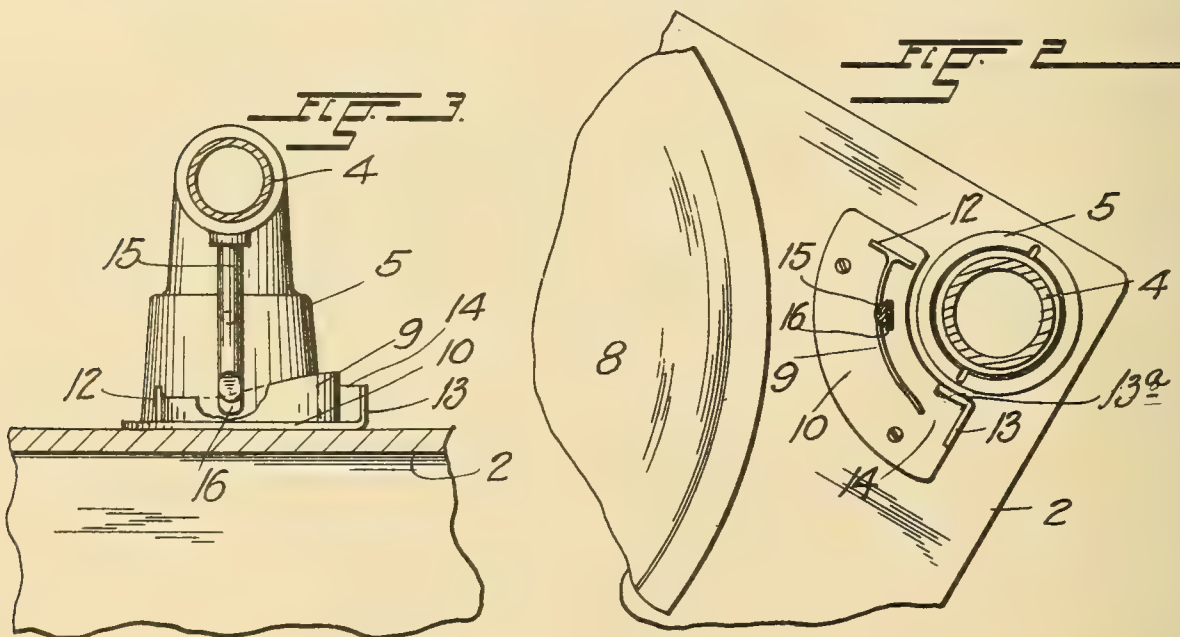
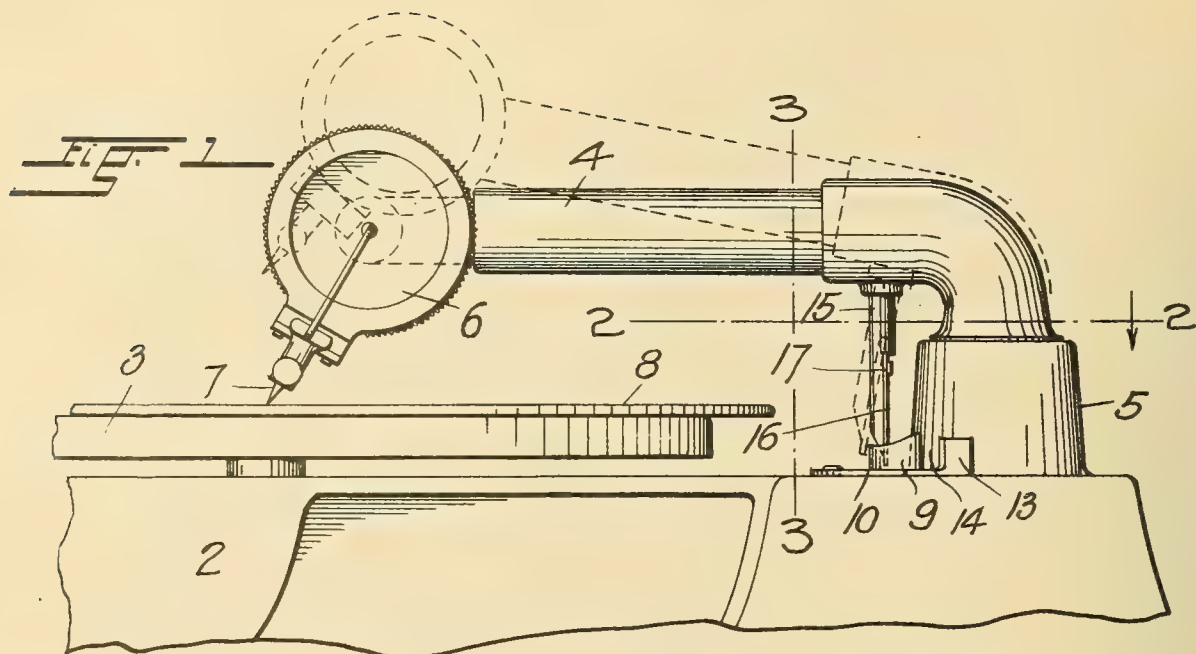
ATTACHMENT FOR PHONOGRAPHS.

1,266,181 ----- G. W. Van Nortwick,
Filed Aug. 20, 1917,
Patented May 14, 1918.

G. W. VAN NORTWICK.
ATTACHMENT FOR PHONOGRAPHS.
APPLICATION FILED AUG. 20, 1917.

1,266,181.

Patented May 14, 1918.
2 SHEETS—SHEET 1.



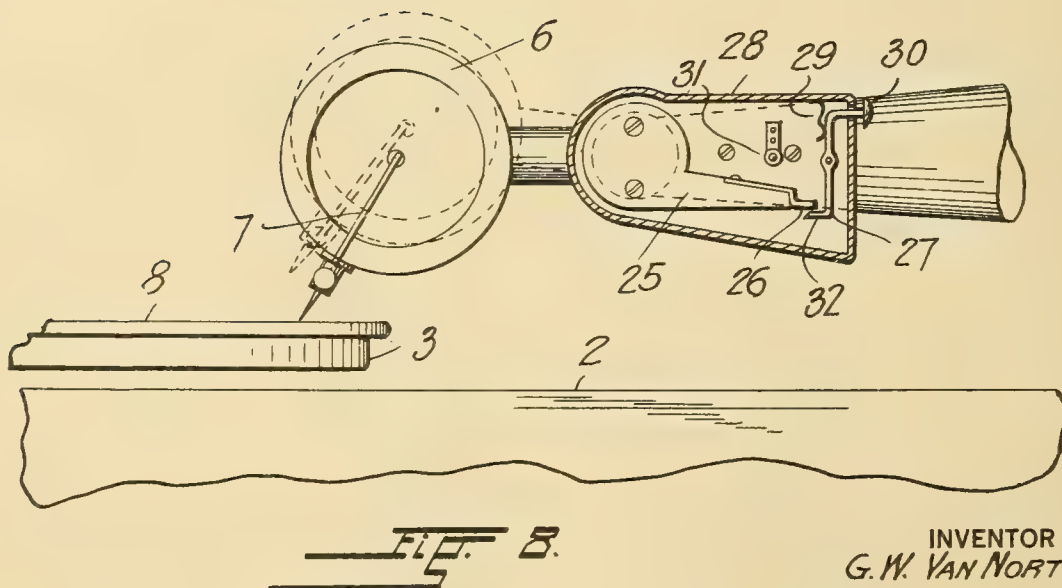
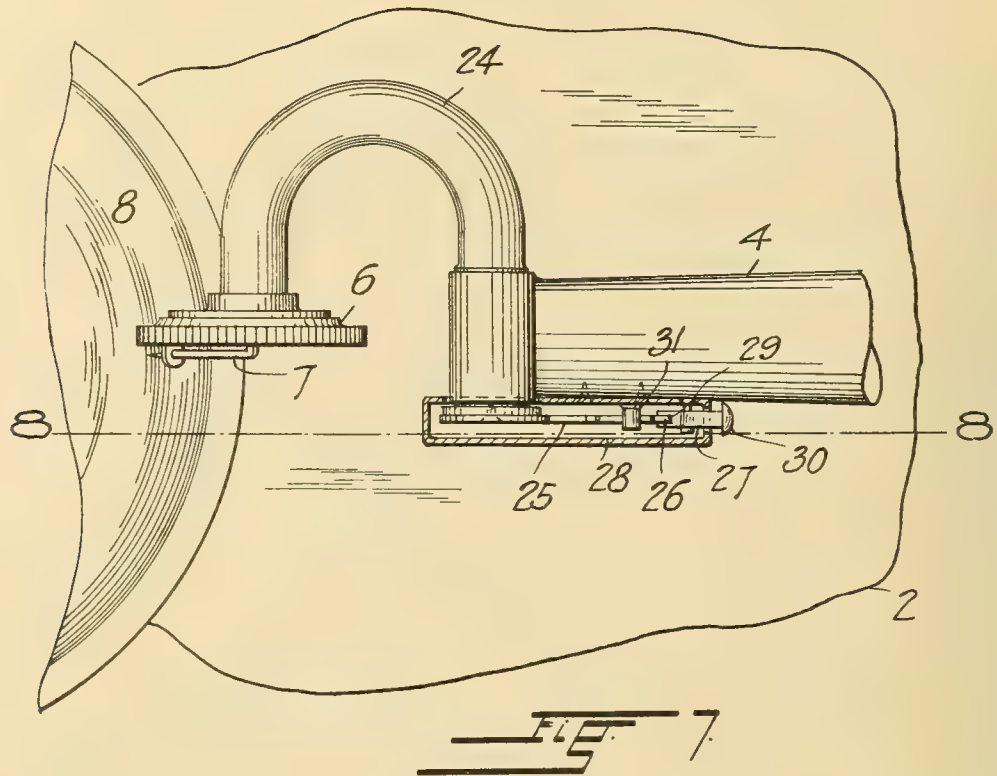
INVENTOR
G. W. VAN NORTWICK.

BY
G. J. McLean
ATTORNEY

G. W. VAN NORTWICK.
ATTACHMENT FOR PHONOGRAPHS.
APPLICATION FILED AUG. 20, 1917.

1,266,181.

Patented May 14, 1918.
2 SHEETS—SHEET 2.



INVENTOR
G. W. VAN NORTWICK.

BY *G. P. Allamby*
ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE W. VAN NORTWICK, OF DENVER, COLORADO.

ATTACHMENT FOR PHONOGRAPHS.

1,266,181.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed August 20, 1917. Serial No. 187,159.

To all whom it may concern:

Be it known that I, GEORGE W. VAN NORTWICK, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Attachments for Phonographs, of which the following is a specification.

My invention relates to attachments for phonographs and its primary object resides in providing a simple appliance by which the needle-carrying element of the instrument is automatically retained in a raised position after it has been lifted to disengage the needle from the record.

By the use of my invention, accidental dropping of the needle or stylus onto the grooved zone of the record is positively avoided, and the arm bearing the needle may be moved across said zone for the purpose of returning the needle to its original position after it has traversed the zone producing groove, without danger of its coming in contact with the grooved portion of the record and without scratching or otherwise marring the same.

With the above object in view, my invention consists of the arrangement of parts and combinations of devices shown in the accompanying drawings in the various views of which like parts are similarly designated, and in which—

Figure 1 is a fragmentary elevation of a phonograph to which my attachment is applied,

Fig. 2, a section taken along the line 2—2, Fig. 1,

Fig. 3, a horizontal section along the line 3—3, Fig. 1,

Figs 4, 5 and 6 sectional views showing modifications of the arm of the appliance shown in Fig. 1,

Fig. 7, a fragmentary plan view of a phonograph showing my invention as applied to a tone-arm on which the sound-box and needle are carried through the instrumentality of a pivoted goose-neck, and

Fig. 8, a section taken along the line 8—8, Fig. 7.

Referring first to Figs. 1, 2 and 3 of the drawings, the reference character 2 designates the motor-box of a phonograph, 3 the record carrying table which is rotatably supported thereon, 4 the tone-arm which is pivoted for lateral or upward movement upon a base 5, 6 the sound-box secured at the

outer end of the arm, and 7 the stylus or needle attached to the sound box to engage a record 8 placed upon the revolving table.

My attachment as applied to a phonograph of the above-described construction, comprises a curved rail 9 which by means of a flange 10 is fastened upon the top of the motor-box adjacent and in concentric relation to the vertical pivotal axis of the tone-arm 4.

Stops 12 and 13 formed on the flange at opposite ends of the rail are provided to limit the lateral movement of the tone-arm as will hereinafter be more fully explained, and a port 14 between one of said stops and the adjacent end of the rail, provides a passage for the movable member of the attachment from one side of the rail to the other.

The movable member above referred to consists of an arm 15 which is rigidly secured to the tone-arm and which when said arm is in its normal operative position in which the needle is in engagement with the record, depends within the space between the rail and the base 5 as shown in full lines in Fig. 1.

The arm carries a leaf-spring 16 which projects beyond its lower end and is fastened at its opposite end as at 17, for lateral deflection.

In the operation of the phonograph the needle on the tone-arm after having traversed the groove of the record is lifted by movement of said arm about a horizontal axis for the purpose of disengaging it from the record and returning it to its original position adjacent the periphery of the table upon which the record is supported.

The upward movement of the tone-arm causes the projecting end of the spring 16 on the arm 15 to engage the concave rearward side of the rail and to thereby deflect until it has passed across the upper edge of the rail when it returns to its original position by its inherent resiliency.

When the tone-arm is subsequently released, the arm 15 extending across the upper edge of the rail, will support the same in a position in which the needle at its outer end is raised above the surface of the record, and it will be retained in this position during its entire movement between the two stops which determine the extent of the movement of the needle across the grooved zone of the record.

When the needle at the outer end of the

tone-arm reaches the periphery of the revolving table, the arm 15 adjacent the opposite end of the same, is brought in register with the port 14 and passes therethrough to
 5 reassume its original position with relation to the rail when the arm is subsequently lowered to bring the needle into contact with the record.

In the construction shown in the drawings, the upper edge of the rail slants upwardly toward the port to gradually increase the distance between the needle and the record and thereby give more room for the adjustment of the needle before it is
 15 placed on the record after the spring on the arm 15 has disengaged the rail. A flange 13^a on the stop 13 prevents by engagement with the arm 16, excessive downward movement of the tone-arm before the needle is
 20 brought to a position above the record.

In the modification shown in Fig. 4, a pawl 18 slides in a recess in the end of the arm 15 and a coiled spring 19 engaging the inner end thereof, are substituted for the
 25 leaf-spring of the first-described form.

In the construction shown in Fig. 5, a pivoted trip 20 at the end of the arm 15 is yieldingly held in its normal position by a spring 21, and in the form shown in Fig. 6,
 30 the arm 15 is provided with a rigid finger 22 and the rail is pivotally mounted on its flange to yield by pressure of the arm, against the action of a spring 23.

In the construction shown in Figs. 7 and 8 my invention has been shown as applied to a phonograph-instrument in which the sound-box 6 and the needle 7 are carried on a goose-neck 24 which is pivotally mounted at the free end of the tone-arm 4.

An arm 25, the equivalent of the arm 15 of the first-described form, is rigidly secured to the goose-neck and provided with a laterally resilient spring 26 which like the spring 16 of the arm 15, projects beyond the
 40 outer end thereof.

A pivoted trip 27, a substitute for the rail 9, is mounted on a support secured to the end of the tone-arm to be engaged by the projecting end of the spring 26 when the
 50 goose neck is lifted to disengage the needle from the record.

The support is preferably made in the form of a casing 28 which incloses the parts of the attachment.

A spring 29 yieldingly holds the trip in its normal position and a button 30 extending outside the casing is provided to move the trip about its pivot against the pressure of the spring to release the arm 25 and there-
 60 by permit the goose-neck to reassume its normal position in which the needle is in engagement with a record on the revolving table of the phonograph.

A buffer 31 made of rubber or other elastic material is secured in the casing to provide

a resilient stop which limits the downward movement of the goose-neck by engagement with the arm 25.

It will be readily seen that the operation of the last-described form of my invention
 70 is identical to that of the first-described construction.

When the goose-neck is raised to lift the needle off the record, the spring 26 engages the bent extremity 32 of the trip 27 and
 75 deflects laterally until it passes the same when by its engagement with the lower edge thereof it holds the goose-neck in a position in which the needle is raised above the surface of the record.
 80

The parts remain in this position during the pivotal movement of the tone-arm across the record until the trip by pressure upon its button 30, is moved out of the path of the spring on the arm 25, which permits the
 85 goose-neck to drop to its original position in which the needle on the sound-box is in contact with the record.

It will be understood without further illustration that any of the modified forms
 90 shown in Figs. 4, 5 and 6 are applicable to the attachment illustrated in Figs. 7 and 8, and that other modifications in the construction and arrangement of the parts of my invention may be resorted to within the
 95 spirit of the same as defined in the following claims.

I claim—

1. The combination with the pivoted needle-carrying element of a phonograph, of
 100 an arm connected therewith, a relatively stationary appliance coöperating with said arm to obstruct the pivotal movement of the element, and a yielding member on the arm adapted to permit of its passing said ob-
 105 structive appliance at a determinate point in a movement of said element to raise the needle, whereby to cause said appliance to obstruct the return movement of the same.

2. The combination with the pivoted
 110 needle-carrying element of a phonograph, of an arm connected therewith, a spring on said arm, adapted to yield in one direction, and an appliance coöperating with said arm to obstruct the pivotal movement of the ele-
 115 ment, after the spring has passed across the same during the stylus-lifting movement of the element.

3. The combination with the pivoted needle-carrying element of a phonograph, of
 120 an arm connected therewith, a spring on said arm, adapted to yield in one direction, and an appliance coöperating with said arm to obstruct the pivotal movement of the element after the spring has passed across the
 125 same during the stylus-lifting movement of the element, said appliance having means to permit of the return movement of the element to its original position.

4. The combination with the pivoted
 130

needle-carrying element of a phonograph, of an arm connected therewith, a spring on said arm, adapted to yield in one direction, and a rail coöperating with said arm to obstruct the pivotal movement of the element after the spring has passed across the same during the stylus-lifting movement of the element.

5 5. The combination with the pivoted needle-carrying element of a phonograph, of an arm connected therewith, a rail disposed to obstruct the pivotal movement of the element, and a yielding member adapted to permit of said arm passing across said rail at a determinate point in the stylus-lifting movement of said element, whereby to cause said rail to obstruct the return movement of the same.

6. The combination with the pivoted needle-carrying element of a phonograph, of an arm connected therewith, a rail disposed to obstruct the pivotal movement of the element, a yielding member adapted to permit of said arm passing across said rail at a determinate point in the stylus-lifting movement of said element, whereby to cause said rail to obstruct the return movement of the same, and stops at opposite ends of said rail to limit the pivotal movement of the arm in a lateral direction.

7. The combination with the pivoted needle-carrying element of a phonograph, of an arm connected therewith, a spring on said arm, adapted to yield in one direction, and a rail coöperating with said arm to obstruct the pivotal movement of the element after the spring has passed across the same during the stylus-lifting movement of

the element, there being a space at an end of said rail for the passage of said arm to permit of a return movement of the element to its original position.

8. The combination with the pivoted needle-carrying element of a phonograph, of an arm connected therewith, a spring on said arm, adapted to yield in one direction, a rail coöperating with said arm to obstruct the pivotal movement of the element after the spring has passed across the same during the stylus-lifting movement of the element, and stops at opposite ends of said rail to limit the pivotal movement of the arm in a lateral direction, there being a port between one of said stops and the adjacent end of the rail, for the passage of said arm to permit of a return movement of the element to its original position.

9. The combination with the pivoted tone-arm of a phonograph, of a projecting member thereon, and a relatively stationary member coöperating with the first-mentioned member to obstruct a downward movement of the tone-arm after the member thereon has passed the stationary member during upward movement of the same, one of the said members being capable of yielding to permit of the member on the tone-arm passing across the stationary member during said upward movement.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE W. VAN NORTWICK.

Witnesses:

L. RHOADES,

F. H. CUNO.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

1,266,280

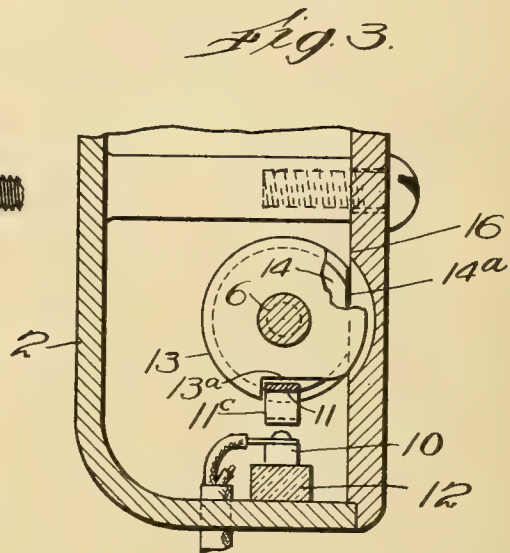
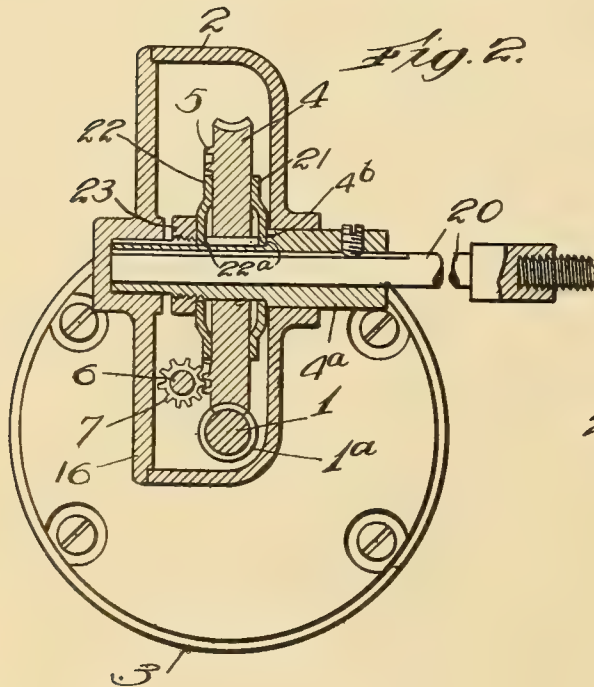
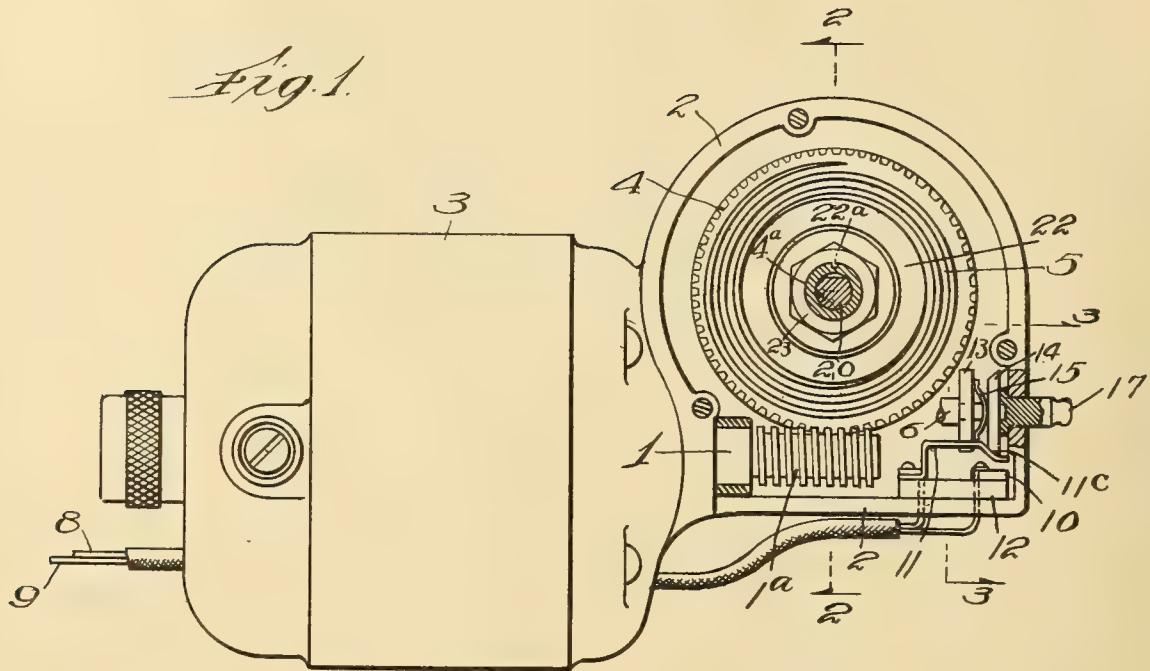
SPRING WINDING ELECTRIC MOTOR

1,266,280 ----- H. Kocourek,
Filed Feb. 3, 1917,
Patented May 14, 1918.

H. KOCOUREK.
 SPRING WINDING ELECTRIC MOTOR.
 APPLICATION FILED FEB. 3, 1917.

1,266,280.

Patented May 14, 1918.



Witness:
Ed. Hunter

Inventor:
 Henry Kocourek,
 by *Burton H. Burton*
 his Attys:

UNITED STATES PATENT OFFICE.

HENRY KOCOUREK, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO JULIA B. STEWART,
EXECUTRIX OF THE WILL OF JOHN K. STEWART, DECEASED.

SPRING-WINDING ELECTRIC MOTOR.

1,266,280.

Specification of Letters Patent. Patented May 14, 1918.

Application filed February 3, 1917. Serial No. 146,539.

To all whom it may concern:

Be it known that I, HENRY KOCOUREK, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented new and useful Improvements in Spring-Winding Electric Motors, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved electric motor particularly adapted for winding up the spring, or the like, of a spring motor, the same being designed especially for the purpose of winding the spring motors of phonographs or sound-reproducing devices. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:—

Figure 1 is an axial section of an electric motor embodying this invention.

Fig. 2 is a section at the line, 2—2, on Fig. 1.

Fig. 3 is a section at the line, 3—3, on Fig. 1.

The electric motor shown in the drawings is of familiar construction as to the field, armature and winding and circuit connections of both field and armature, said customary parts being represented in familiar or conventional form requiring no specific description. The armature shaft, 1, extends into a casing, 2, mounted or built upon one end of the main motor casing, 3, said casing, 2, being for inclosing a speed-reducing train which comprises a worm, 1^a, upon the armature shaft, 1, meshing with a worm gear 4, journaled on a shaft, 4^a in the casing, 2, and extending in alinement with,—and as here shown extending out through,—an aperture in one side wall of said casing, 2 and having upon one face a helical thread or gear element, 5, which meshes with a pinion, 7, on a shaft, 6, parallel to the armature shaft. The motor-energizing circuit wires, 8 and 9, extend into the casing, 3, and are connected with contact pieces, 10 and 11, mounted upon an insulating block, 12, the contact piece, 11, being a spring contact

adapted to be forced into contact with the piece, 10, for closing the circuit and to react out of contact therewith. The contact-making arm of said contact piece, 11, extends in general parallel with the shaft, 6, which is on the opposite side of said contact piece, 11, from the contact piece, 10. On the shaft, 6, there are two cams, both of fiber or other insulating material, one of the cams, 13, is mounted for rotation with the shaft, 6, and is circular except as to a peripheral notch or recess, 13^a, which has one shoulder abrupt and the other sloping, so that as the cam rotates with the shaft, 6, the spring contact piece, 11, at one position in the rotation of the cam rests in the recess or notch and is out of contact with the contact piece, 10, while during the remainder of the rotation of the contact piece it first, as a cam, crowds the spring-contact piece, 11, into contact with the piece, 10, closing the circuit, and during the remainder of the operation until the notch again comes around to said spring-contact piece, holds the two contact pieces in contact, maintaining the circuit closed. The other cam, 14, is mounted for longitudinal movement along the shaft and preferably, though not necessarily, it is loose on the shaft as to rotation so that it is not rotated by said shaft, 6. As illustrated, it is positively prevented from thus rotating by having a small segment cut away at one side as seen at 14^a, making a flat portion which seats against the cover, 16, of the casing, 2. This cam, 14, has one edge beveled engaging the slopingly bent end portion, 11^c, of the contact piece, 11, so that when said cam, 14, is forced inward along the shaft, 6, the engagement of said beveled edge of said cam with the sloping end portion of the contact piece, 11, forces the latter into contact with the piece, 10, and closes the circuit. The elastic reaction of the contact piece, 11, tends to force the cam, 14, out along the shaft, permitting the necessary reaction for movement out of contact of the contact pieces, 11 and 10; but more perfectly to insure this reaction there is interposed between the cams, 13 and 14, on the shaft, 6, a spring, 15, which insures said reacting movement. There is mounted in the end wall of the cas-

ing, 2, a circuit-breaking push button, 17, which may be conveniently centered on the end of the shaft, 6, but which is without engagement therewith, and which serves, by
 5 being thrust inward, for forcing the cam, 14, in the direction for forcing the contact piece, 11, into circuit-closing contact with the contact piece, 10, and holding the circuit closed as long as the operator continues to press
 10 the push-button, but ready upon release of the push-button, to react out of contact with the contact piece, 10. But it will be observed that such reaction can only occur when the recess, 13^a, of the cam, 13, is in a
 15 position to receive the contact piece, 11, in said reacting movement. The result is that when the operator has pressed the push button for establishing the contact and closing the circuit and the motor has been thereby
 20 energized, the push-button being held depressed long enough to permit the rotation of the motor to rotate the cam, 13, far enough to take the notch, 13^a, away from the contact piece, 11, the circuit will remain closed, not-
 25 withstanding the release of the push button, until the cam, 13, completes its revolution, bringing the notch again around into position to receive the contact piece, 11, which will then react back into it, opening the cir-
 30 cuit. The device thus operates to automatically open the circuit and deenergize the motor after a certain period of operation commenced by the manual operation of the push-button.

35 The mode of use of the device for winding the spring motor of a phonograph, or like instrument, is that the motor is mounted upon the winding shaft of the phonograph by means of a shaft, 20, which extends
 40 through the hollow or axially apertured shaft, 4^a, of the gear, 4, with a sliding and feathered or equivalent engagement therewith so as to be movably engageable with and be rotated by said gear shaft, 4^a, said
 45 shaft, 20, being arranged to be screwed or otherwise entered into connection with the winding shaft of the motor, in whatever manner the usual winding crank is arranged to be attached to said winding shaft,
 50 the winding-up motor being then mounted on said shaft, 20, by sliding the hollow shaft, 4^a, onto said shaft, 20. When intending to operate the phonograph, the user, not knowing to what extent the phonograph
 55 motor may be wound, will depress the push button, causing the motor to be energized, and to wind the motor to the extent corresponding to one complete revolution of the cam, which, as designed in the present in-
 60 strument is ten revolutions of the winding shaft. If the phonograph motor is so nearly wound up that ten revolutions or less will complete the winding, this fact will be disclosed by the stopping of the winding shaft

when the phonograph motor is completely 65 wound, and if not the operator will again depress the push button and will repeat this process until the phonograph motor is wound as tightly as the user desires. In order that the electric motor may not be
 70 stalled, and thereby become over-heated from remaining in circuit after the winding is completed as far as the electric motor can wind it, the gear, 4, is frictionally carried on its shaft, 4^a, between two spring disks, 21
 75 and 22, at opposite sides of said gear, the disk, 21, being stopped against a shoulder, 4^b, on the shaft, 4^a, and the disk, 22, being bound against the opposite side of the gear by a nut, 23, screwed onto the shaft, 4^a, and which
 80 may be screwed up to any desired degree of tightness. It will be understood that the disks, 21 and 22, are splined on the shaft so as to rotate therewith, as shown at 22^a.

I claim:—

1. In a winding motor in combination with the electric circuit in which it is energized, an armature shaft; a speed-reducing train actuated thereby; a cam actuated by said train; a contact piece actuated by the
 90 cam for closing the circuit adapted to cause the circuit to be open at a certain position in each cycle of the cam's movement; a manually-operable circuit breaker operating on the same contact piece which the cam ac-
 95 tuates.

2. In a spring winding motor in combination with the electric circuit in which it is energized, the armature shaft; a speed-reducing train rotated thereby; a cam rotated
 100 by said train; a contact piece actuated by the cam for closing the circuit at a certain point in each revolution of the cam; a manually-operable circuit-breaker operating upon the same contact piece which the cam
 105 actuates.

3. In a spring-winding motor in combination with the circuit in which it is energized, the armature shaft; a speed-reducing train actuated thereby; two cams on a shaft of
 110 said train, one rotated thereby and the other movable therealong, the first of said cams having a peripheral recess with an abrupt shoulder at one side and a slope at the other side for permitting the circuit to be closed
 115 at a certain point in the revolution of the cam, the other cam having a beveled periphery, positioned for engaging the same contact piece which the first-mentioned cam actuates, and means for manually operating
 120 said second cam axially along the shaft.

4. In an electric winding motor in combination with the circuit in which it is energized, a rotary armature shaft, a winding train actuated by said shaft; circuit-making-
 125 and-breaking connections and circuit-controlling means in said train adapted to automatically open the circuit after a pre-

determined number of revolutions of the armature shaft, and a yielding frictional drive connection in the train at a point therein subsequent to the circuit-controlling
5 means adapted to slip upon a predetermined resistance to rotation, to permit the motor to complete the number of revolutions for

opening the circuit regardless of the resistance of the spring wound.

In testimony whereof, I have hereunto 10
set my hand at Jersey City, N. J., this 29
day of January, 1917.

HENRY KOCOUREK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."

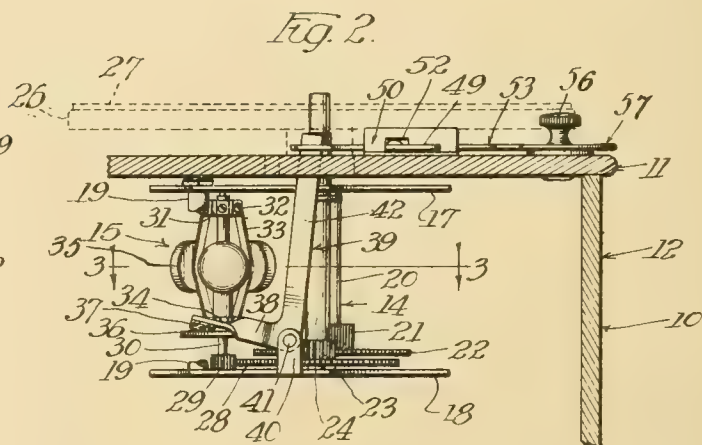
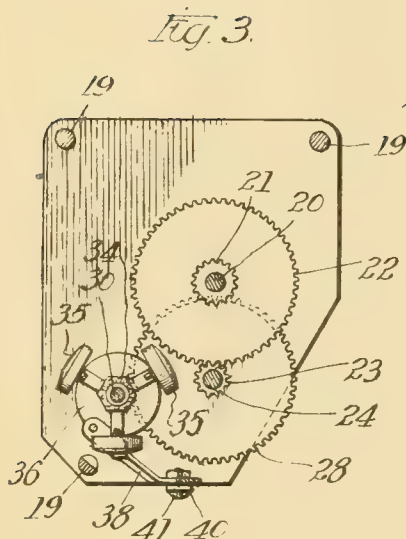
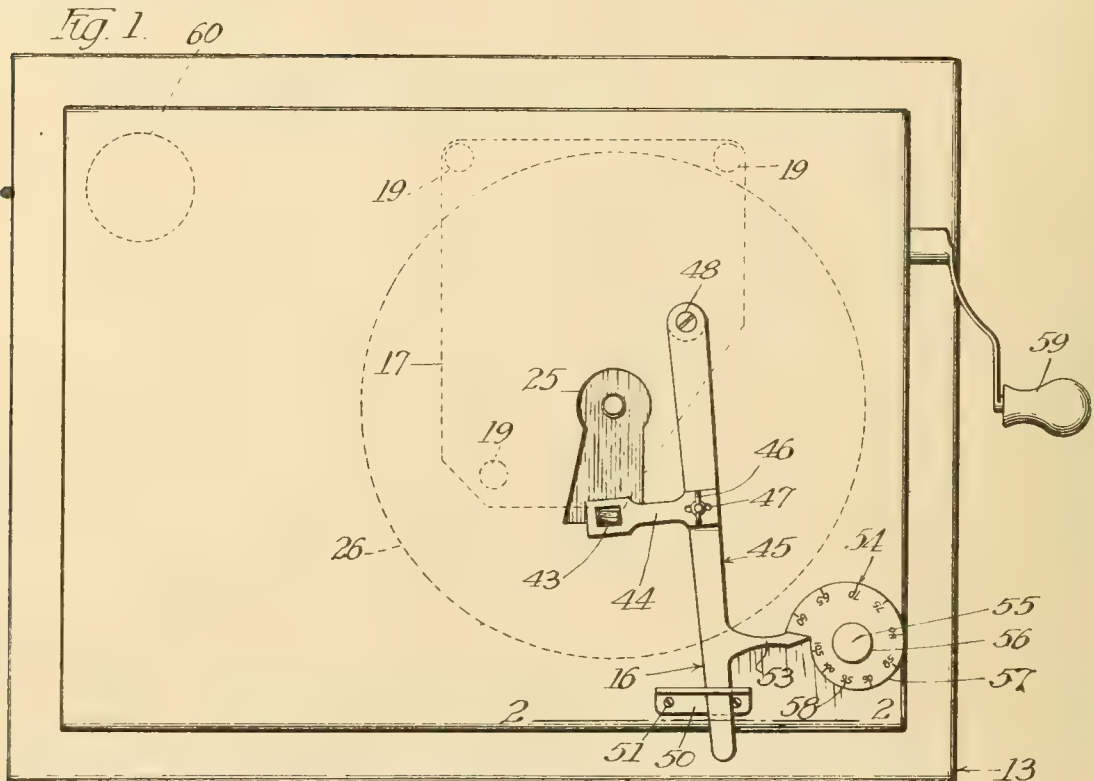
CENTRIFUCAL SPEED REGULATOR FOR PHONOGRAPHS.

1,266,306 ----- A. E. Parnall,
Filed Apr. 12, 1915,
Patented May 14, 1918.

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CENTRIFUGAL SPEED REGULATOR FOR PHONOGRAPHS.
APPLICATION FILED APR. 12, 1915.

1,266,306.

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CENTRIFUGAL SPEED-REGULATOR FOR PHONOGRAPHS.

1,266,306.

Specification of Letters Patent. Patented May 14, 1918.

Application filed April 12, 1915. Serial No. 20,863.

To all whom it may concern:

Be it known that I, ARCHIE E. PARNALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Centrifugal Speed-Regulators for Phonographs, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to phonographs and more specifically to improvements in the means for controlling the starting and stopping and speed of the record support.

Among the objects of my invention is to provide such means which will be simple in construction and efficient in use, and in which the same lever which controls the starting and stopping of the record support is also used in controlling the speed.

Further objects will appear from the detailed description to follow and the appended claims.

In the drawing, in which I have illustrated one embodiment of my invention—

Figure 1 is a plan view of a phonograph showing the controlling lever and the adjustable stop;

Fig. 2 is a vertical section substantially on the line 2—2 of Fig. 1, showing the governing mechanism and the controlling lever, and the connections therebetween; and

Fig. 3 is a section substantially on the line 3—3 of Fig. 2 showing the driving and transmission mechanism and the governing mechanism.

Referring now to the drawing in detail the parts of the phonograph shown comprise the casing or cabinet 10 having a top 11, side walls 12, a base 13, the driving and transmission mechanism indicated in general at 14, the governing mechanism indicated at 15, and the starting, stopping and speed controlling mechanism indicated at 16.

The driving, transmission and governing mechanism is supported by and between two plates 17 and 18 (Fig. 2), which plates are connected together and supported from the top 11 of the casing by means of three upright posts 19. The driving and transmission mechanism comprises a vertical shaft 20 journaled in the plates 17 and 18, a pinion 21 secured to the shaft 20 and driven from any suitable source of power, such as

a spring motor (not shown), and a gear 22 secured to the shaft 21 and meshing with a pinion 23 which is secured on a vertical shaft 24 journaled in the plates 17 and 18. The upper end of the shaft 24 extends through an opening 25 in the top 11 of the casing and has secured thereto the record support indicated in dotted lines at 26 (Figs. 1 and 2), on which the record, indicated at 27, rests. A spur gear 28 is secured to the shaft 24 and meshes with a pinion 29 which is secured on the governor shaft 30 which is mounted in suitable bearings on the plates 17 and 18. A collar 31 (Fig. 2) is secured on the upper end of the shaft 30 by means of a set screw 32. Spring strips 33 are secured at their upper ends to the collar 31 and at their lower ends to a collar 34 which is slidably mounted on the governor shaft 30. Weights 35 are secured to the springs 33 intermediate their lengths. A friction brake disk 36 is secured to the collar 34 to slide therewith and is engaged by a brake shoe 37 which may be a felt punching, secured to one arm 38 of a bell crank lever 39 which is mounted on a bracket 40, secured to the plate 18, by means of a screw 41 extending through the bracket and lever. The other arm 42 of the lever 39 extends upwardly through the opening 25 and into an opening 43 in the link 44 which is adjustably secured to the lever 45 by means of a wing nut 46 which engages a threaded member extending through the slot 47 in the link 44. The lever 45 is pivotally mounted on the top 11 of the casing in any suitable manner as by means of a screw 48 extending through an opening in the lever and into the top 11 of the casing.

The movable end of the lever 45 extends through a slot or opening 49 in a bracket or keeper 50 which is secured to the top 11 by means of screws 51. The slot 49 has an off-set portion 52 with which the end of the lever 45 engages when it is moved to the extreme left, the lever 45 being constructed of resilient material and the tension in the lever being such as to tend to hold the end of the lever up in the off-set portion 52. The lever 45 has a projection 53 which is used as a pointer and also engages an adjustable stop 54 which is rotatably mounted to move around the center 55. A thumb piece 56 is secured to the adjustable stop by means of which it may be rotated. The stop has a

spiral face or edge portion 57 with which the projection 53 engages. Graduations 58 are provided adjacent the spiral edge 57 for coöperation with the pointer 53. The phonograph is provided with the usual handle 59 for winding up the spring and with the usual tone arm, the base of which is indicated diagrammatically at 60.

The use and operation of my device is as follows: Assuming that the lever 45 is in its left hand position and that its end is engaged within the off-set portion 52 of the slot, the friction between the brake shoe 37 and the brake disk 36 will be so great that the motor will not be able to drive the record support. The adjustable stop 54 is then set to give the desired time and pitch to the selection to be played by manipulating the thumb piece 56 and observing the graduations 58 and the pointer 53. The end of the lever 45 is then pressed down to release it from its engagement within the off-set portion 52 of the slot and the lever is then moved to the right until the projection 53 comes into engagement with the spiral edge or face 57 of the adjustable stop 54. This movement of the lever 45 raises the brake shoe 37 and permits the motor to rotate the record support and also the governing mechanism until the weights 35 on the governing mechanism fly out sufficiently against the tension of the springs 33 to lift the friction plate 36 up against the brake shoe 37 with sufficient force to maintain the speed of the governor, and consequently the record support, constant.

It will be seen that the speed at which the phonograph will run will depend on the height to which the brake shoe 37 is lifted which, in turn, will depend upon the distance to which the lever 45 is moved to the right, and that this distance will depend on the position of the adjustable stop 54. After the stop 54 has been set to give the desired pitch and tempo the phonograph can be stopped and started again as often as desired and will always come back to the same pitch and tempo.

The adjustable connection between the link 44 and the lever 45 is provided to take up the wear on the parts such as the wear between the brake shoe 37 and the friction plate 36.

It will be noted that I have provided a device in which the starting and stopping and speed of the record support is controlled by means of a single lever, and set of con-

nections with the governing device, and means are provided whereby after the desired pitch and tempo have been provided for the machine may be stopped and started as often as desired and will always come back to the desired pitch and tempo.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A phonograph comprising movable speed controlling means accessible for manual operation and movable to a position to stop the phonograph, and an adjustable stop for said speed controlling means, said stop having a spiral face for engagement with said speed controlling means.

2. A phonograph comprising movable speed controlling means accessible for manual operation and movable to a position to stop the phonograph, and a rotatable adjustable stop for said speed controlling means.

3. A phonograph comprising a movable speed controlling means accessible for manual operation and movable to a position to stop the phonograph, and an adjustable stop for said speed controlling means, said means having a projection thereon for engagement with said stop.

4. A phonograph comprising a movable speed controlling means accessible for manual operation and movable to a position to stop the phonograph, and an adjustable stop for said speed controlling means, said stop having a spiral portion, and said means having a projection thereon for engagement with said spiral portion.

5. A phonograph comprising movable speed controlling means accessible for manual operation and movable to a position to stop the phonograph, and an adjustable stop for said speed controlling means, said stop comprising a flat member having a spiral edge for engagement with said speed controlling means.

6. A phonograph comprising movable speed controlling means accessible for manual operation and movable to a position to stop the phonograph, and an adjustable stop for said speed controlling means, said stop comprising a flat member having a spiral edge for engagement with said speed controlling means, and a thumb piece for adjusting said stop.

In witness whereof, I have hereunto subscribed my name.

ARCHIE E. PARNALL.

TALKING MACHINE MECHANISM.

1,266,307 ----- A. F. Parnall,
Filed Sept. 18, 1916,
Patented May 14, 1918.

A. E. PARNALL.
TALKING MACHINE MECHANISM.
APPLICATION FILED SEPT. 18, 1916.

1,266,307.

Patented May 14, 1918.

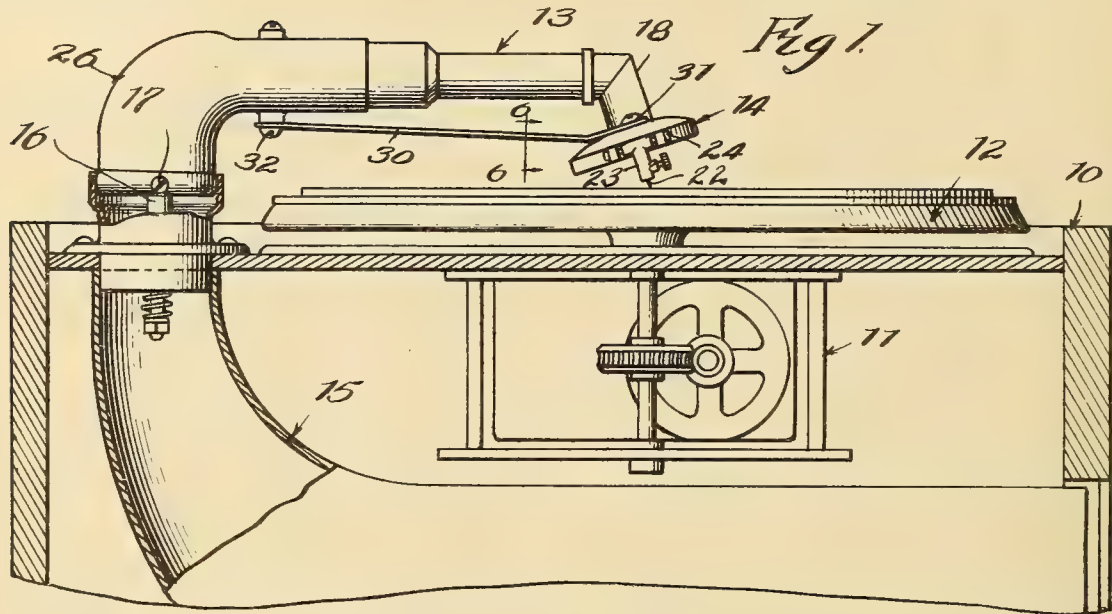


Fig. 2.

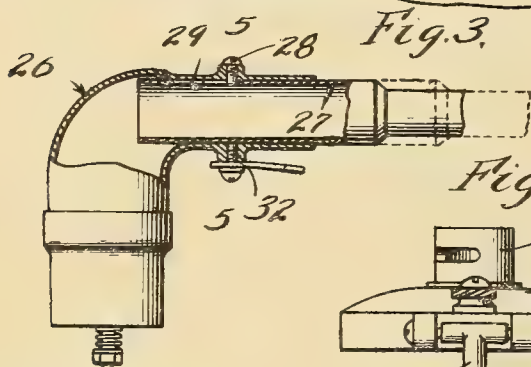
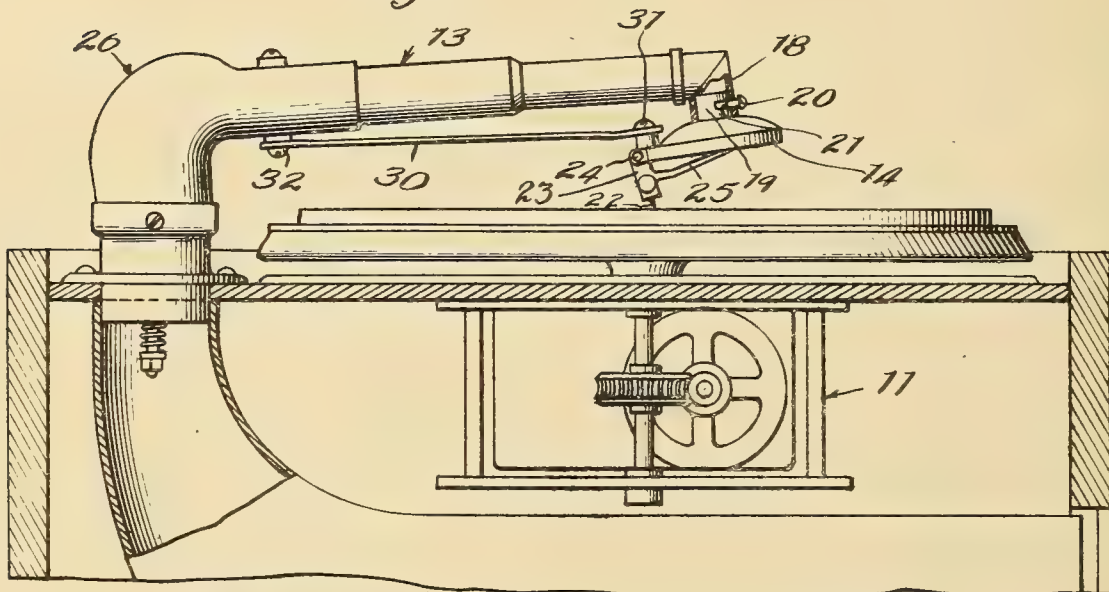


Fig. 6.

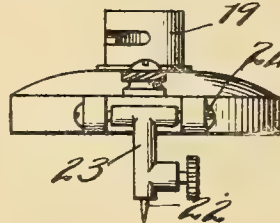


Fig. 4.

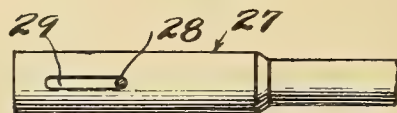
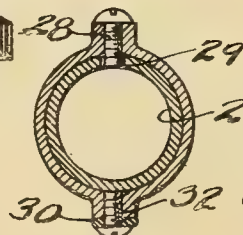


Fig. 5.



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TALKING-MACHINE MECHANISM.

1,266,307.

Specification of Letters Patent.

Patented May 14, 1918.

Application filed September 18, 1916. Serial No. 120,820.

To all whom it may concern:

Be it known that I, ARCHIE E. PARNALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Talking-Machine Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to talking machine mechanism.

One of the objects of my invention is to provide an improved construction whereby a machine can be easily and quickly changed for playing either a laterally undulating groove record or a hill and dale groove record, which will be simple in construction and effective.

In the drawings, in which an embodiment of my invention is shown—

Figure 1 is a vertical section of a talking machine showing the sound box in position for playing the laterally undulating groove record;

Fig. 2 is a vertical axial section of a talking machine showing the sound box in position for playing a hill and dale groove record;

Fig. 3 is a fragmentary side elevation of part of the tone arm, parts being in section to show the interior construction;

Fig. 4 is a fragmentary view of part of one of the sections of the tone arm;

Fig. 5 is a vertical section on the line 5—5 of Fig. 3; and

Fig. 6 is a side elevation of the sound box.

Referring to the drawings in detail my invention is shown in connection with a talking machine comprising a casing 10, driving and transmission mechanism 11 housed in the casing, a record support 12 driven from the mechanism 11, a tone arm 13, a sound box 14 supported by the tone arm, and an amplifier 15 located in the casing and in communication with the tone arm.

The casing, driving mechanism, record support and amplifier may be of any usual or suitable construction and are not described in detail.

The tone arm 13 is mounted in any suitable manner to swing about a vertical axis on the pin 16 to permit the needle to follow the groove in the record, and is also mounted to swing about a horizontal axis on a bear-

ing 17 to permit a vertical movement of the free end of the tone arm, necessitated by the change in position of the sound box for the two types of record. The free end of the tone arm terminates in a downwardly and outwardly extending tubular portion 18 on which is rotatably mounted a tubular portion 19 extending centrally and axially from the sound box, the sound box being thus rotatably mounted to swing about an axis in a vertical plane through the axis of the tone arm. Any suitable means may be provided for holding the sound box in position on the tone arm, such as a screw 20 threaded through the tubular portion 18 and extending into a slot 21 in the tubular portion 19. A needle 22 is secured in the needle arm 23 which arm is pivoted at 24 to the sound box and has a laterally extending arm 25 for actuating the diaphragm of the sound box.

In using the machine with a hill and dale groove record the sound box is placed as shown in Fig. 2. The hill and dale groove will give an up and down vibration to the needle 22 which will be communicated to the diaphragm of the sound box through the laterally extending arm 25.

In using the machine with a laterally undulating groove record the sound box is placed as shown in Fig. 1; the laterally undulating groove will cause a lateral vibration of the needle which will cause up and down vibration of the diaphragm through the laterally extending arm 25. The change in position of the sound box from the position shown in Fig. 2 to that of Fig. 1 necessitates a vertical movement of the free end of the tone arm which is permitted by the swinging movement of the tone arm on the bearing 17 about a horizontal axis.

In order that the needle 22 may have substantially the same radius of movement when used with the two types of record the tone arm is made extensible from the position shown in Fig. 1 to the position shown in Fig. 2. This is accomplished by making the tone arm in two telescoping sections, 26 and 27, respectively. For limiting the telescoping movement and holding the sections in their proper relative positions a pin or screw 28 may be threaded through the section 26 and extended into a slot 29 in the section 27. The telescoping movement is limited by the length of the slot 29.

In order that it may not be necessary to

make the adjustment for the sound box independently of the adjustment for the tone arm means are provided whereby when the sound box 14 is rotated on the tone arm from the position shown in Fig. 1 to the position shown in Fig. 2 the tone arm will be extended. For this purpose a link 30 is pivotally connected at one end 31 to a portion of the sound box adjacent the needle arm 23, and is pivotally connected at its other end 32 to a section 26 of the tone arm.

With this construction simply rotating the sound box on the tone arm will effect the telescoping movement of the tone arm and the needle arm 23 will always remain at substantially the same distance from the vertical axis of the tone arm.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A talking machine comprising a tone arm mounted to swing about a vertical axis, a sound box mounted on said tone arm to swing about an axis, lying in a vertical plane through the axis of the tone arm from a

position in which the needle will properly engage a laterally undulating groove record to a position in which it will properly engage a hill and dale groove record, said tone arm being extensible, and means whereby rotation of the sound box about its axis, will cause said tone arm to be extended.

2. A talking machine comprising a tone arm mounted to swing about a vertical axis, a sound box mounted on said tone arm to swing about an axis lying in a vertical plane through the axis of the tone arm from a position in which the needle will properly engage a laterally undulating groove record to a position in which it will properly engage a hill and dale groove record, said tone arm being extensible, and means whereby rotation of the sound box about its axis will cause said tone arm to be extended, said means comprising a link pivotally connecting said tone arm and sound box.

In witness whereof, I have hereunto subscribed my name.

ARCHIE E. PARNALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

AUTOMATIC RECORD SHIFTING MECHANISM FOR PHONOGRAPHS.

1,266,767 ----- E. E. Brosius,
Filed Mar. 20, 1917,
Patented May 21, 1918.

E. E. BROSIUS.
 AUTOMATIC RECORD SHIFTING MECHANISM FOR PHONOGRAPHS.
 APPLICATION FILED MAR. 20, 1917.

1,266,767.

Patented May 21, 1918.
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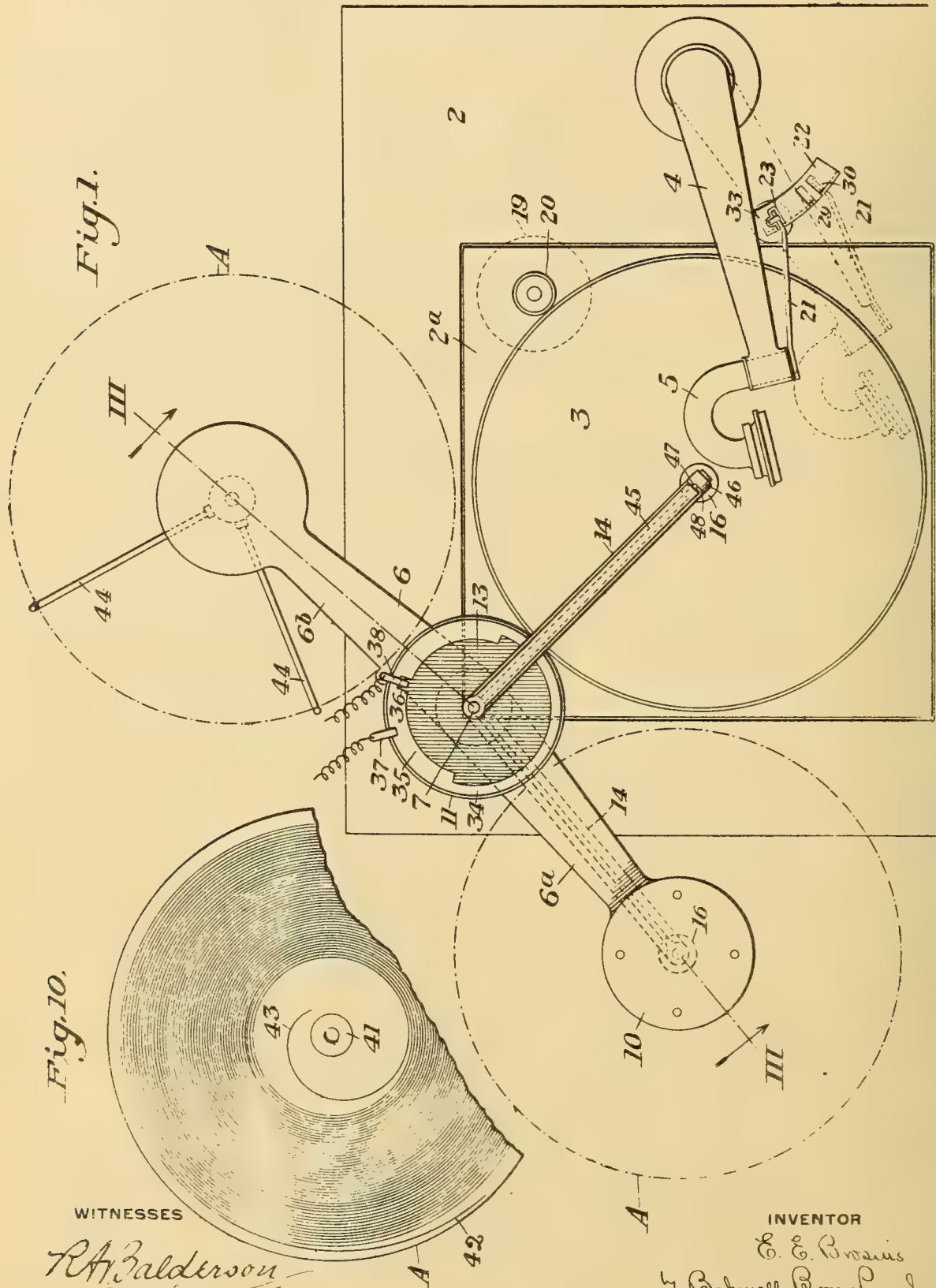


Fig. 10.

WITNESSES

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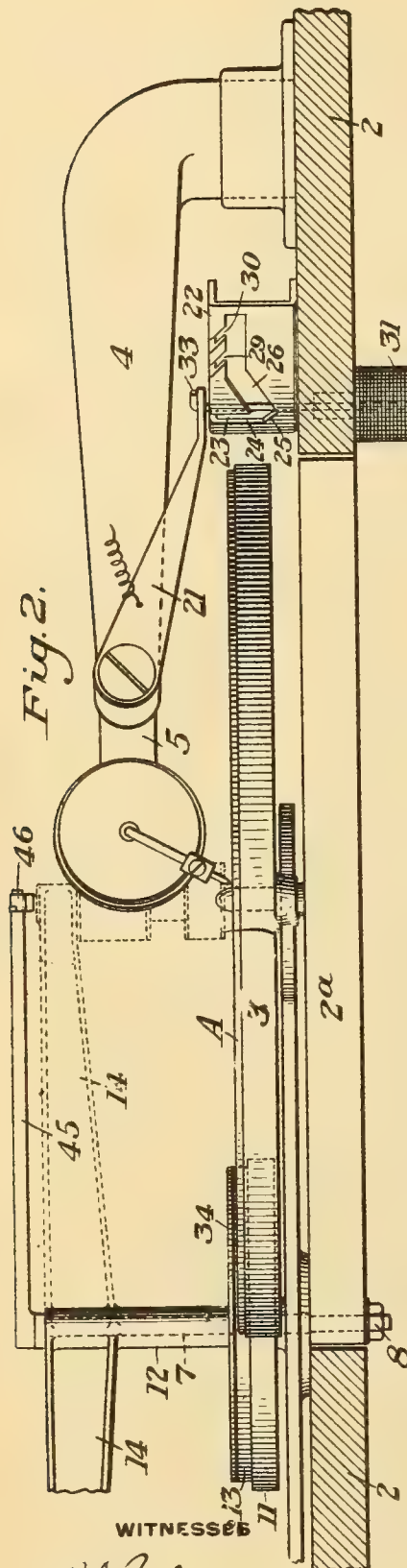
E. E. Brosius
 by Robert R. Palmer
 Attys.

AUTOMATIC RECORD SHIFTING MECHANISM FOR PHONOGRAPHS.

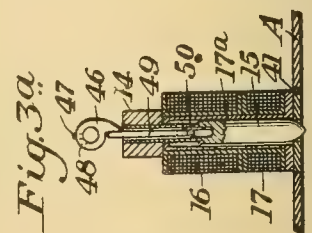
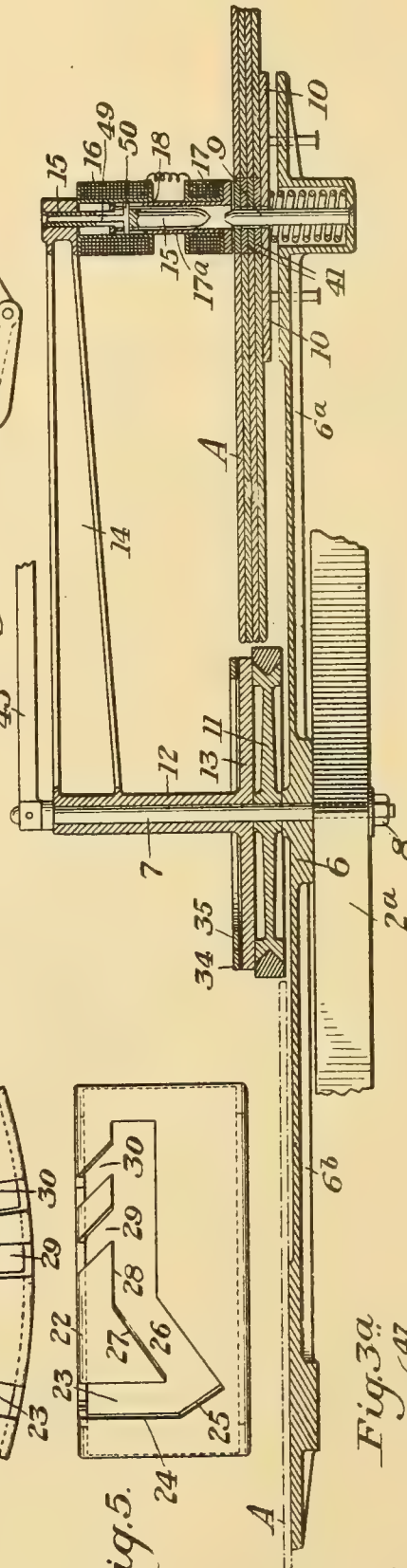
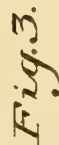
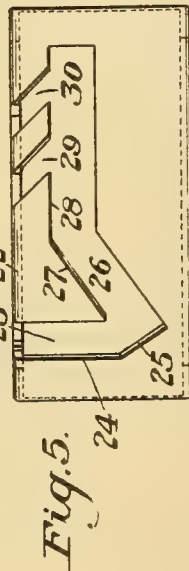
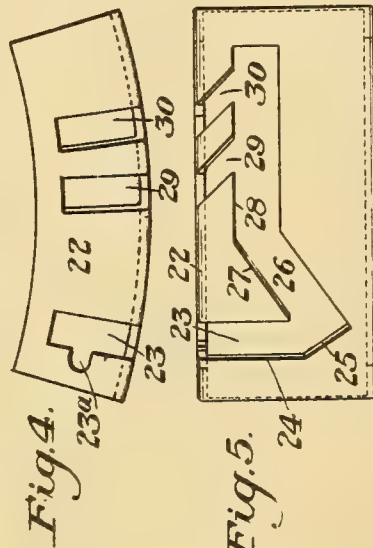
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3 SHEETS—SHEET 2.

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WITNESSES



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 AUTOMATIC RECORD SHIFTING MECHANISM FOR PHONOGRAPHS.
 APPLICATION FILED MAR. 20, 1917.

1,266,767.

Patented May 21, 1918.
 3 SHEETS—SHEET 3.

Fig. 9.

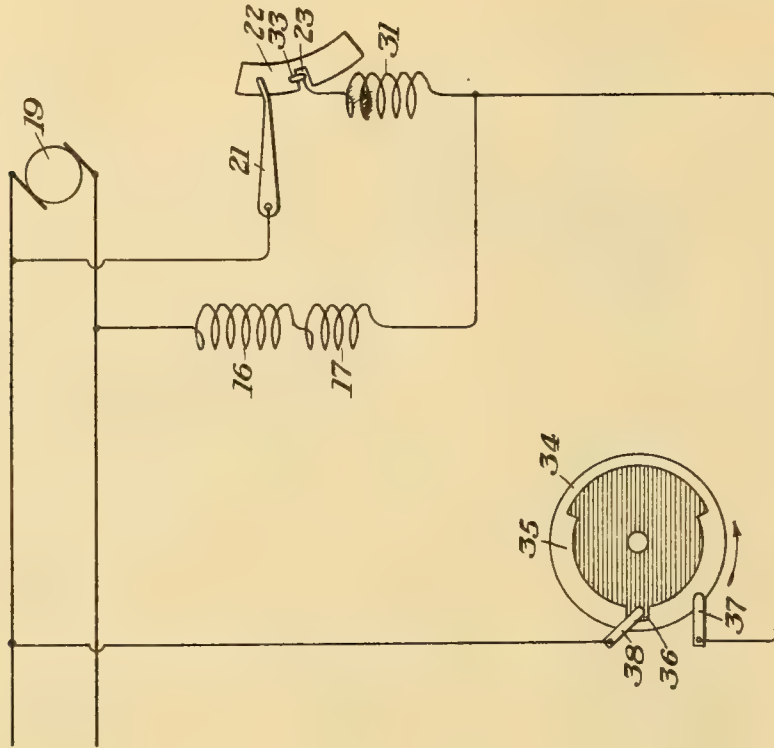


Fig. 6.

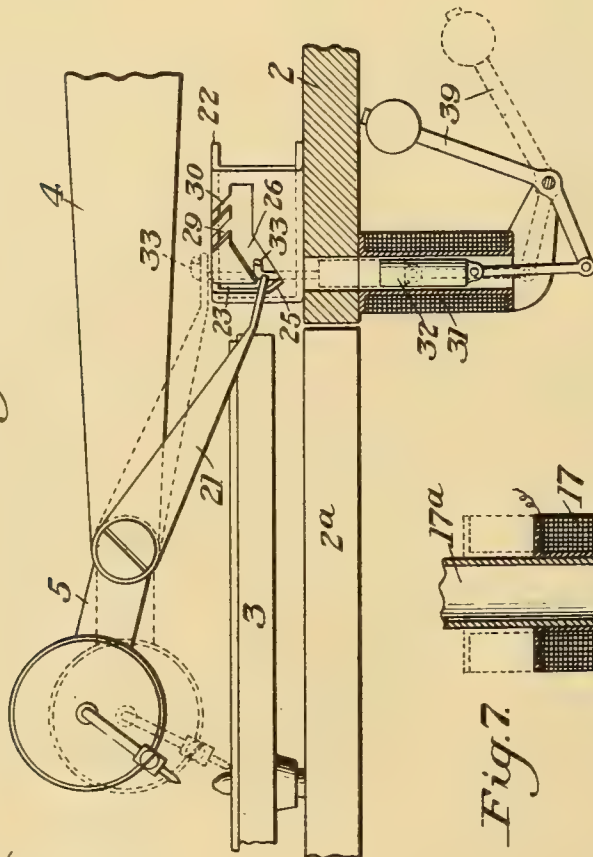


Fig. 8.

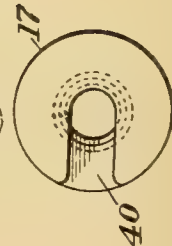
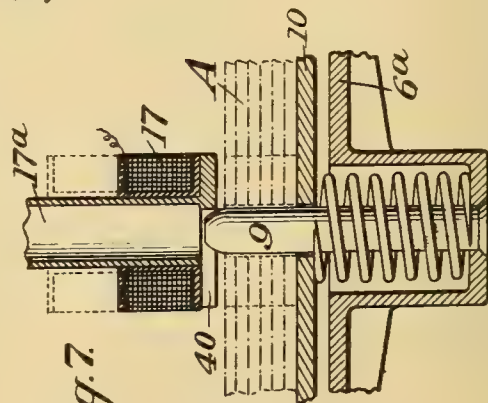


Fig. 7.



WITNESSES

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 Attys.

UNITED STATES PATENT OFFICE.

EDGAR E. BROSIUS, OF PITTSBURGH, PENNSYLVANIA.

AUTOMATIC RECORD-SHIFTING MECHANISM FOR PHONOGRAPHS.

1,266,767.

Specification of Letters Patent.

Patented May 21, 1918.

Application filed March 20, 1917. Serial No. 156,029.

To all whom it may concern:

Be it known that I, EDGAR E. BROSIUS, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Automatic Record-Shifting Mechanism for Phonographs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view showing a phonograph equipped with my invention;

Fig. 2 is a sectional elevation of the same;

Fig. 3 is a section on the line III—III of Fig. 1 with the record-shifting arm swung to another position;

Fig. 3^a is a detail sectional view;

Figs. 4 and 5 are, respectively, a top and a front elevation of the slot plate;

Fig. 6 is a sectional elevation showing the solenoid and its connections for raising the needle;

Fig. 7 is a detail sectional view showing a portion of the record holder or magazine and the pick-up magnet;

Fig. 8 is a bottom plan view of the lower pick-up magnet;

Fig. 9 is a wiring diagram;

Fig. 10 is a partial plan view of one of the records.

My invention has relation to mechanism for automatically shifting the records of a phonograph, and is designed to provide a simple mechanism of this character by means of which a phonograph may be caused to play a plurality of records in succession without the necessity for manual attention.

My invention also provides mechanism of this character which is readily adapted to existing machines. My invention is applicable to all phonographs of the disk record type.

The nature of my invention will be best understood by reference to the accompanying drawings, in which I have shown the preferred embodiment thereof, and which will now be described, it being premised, however, that various changes can be made in the details of construction and arrangement of the several parts, without departing from the spirit and scope of my invention as defined in the appended claims.

In these drawings, the numeral 2 designates the top portion of a phonograph casing, 3 the revolving record-carrying disk or

support, and 4 the swinging reproducing arm having the reproducer 5 pivotally connected thereto. These parts may be, in general, of the usual form.

The numeral 6 designates a two-armed bracket which may be rigidly but detachably secured to the frame 2 by means of the post 7, secured by the nut 8. One arm 6^a of this bracket forms a support or magazine holder for a plurality of unplayed records A. It is preferably provided with a centering pin 9, for the records and with a spring-pressed follower 10 (as best shown in Fig. 3) the records being directly supported upon this follower. The other arm 6^b of the bracket 6 forms a support or detachable holder for the played records as they are moved out of playing position. Loosely journaled on the post 7 is a friction wheel 11, whose periphery is in frictional contact with the periphery of the disk 3. This friction wheel is constantly driven while the phonograph is in operation. 12 is a sleeve which is also loosely journaled on the post 7, and which carries a disk 13, at its lower end which rests in frictional contact with the upper surface of the disk 11. The sleeve 12 carries at its upper portion a horizontally extending record-shifting arm 14, which at its outward extremity is provided with a depending guide pin 15. Rigidly secured to the arm around this guide pin is a magnet 16 of the solenoid type. 17 is another magnet having its core portion 17^a extended upwardly within the solenoid magnet 16, as shown at 18. The pin 15 is made of sufficient length that when a record is held in the raised position by the magnets, it will enter the central hole of the record, and thus center the same.

The numeral 19 designates a driving motor of any suitable or usual type for the phonograph, said motor having a frictional wheel 20, in contact with the periphery of the disk 3. The current for energizing the solenoids 16 and 17 is most conveniently taken from the supply circuit for this motor, as best indicated in Fig. 9, but in the case of a spring-driven machine, may be derived from a battery.

The numeral 21 indicates a lever arm which is rigidly secured to the shank of the reproducer 5. This lever arm extends backwardly at one side of the reproducer arm 4, and is adapted to travel upon a slot plate 22, secured to the top 2 of the phonograph.

The plate 22 has therein the vertical slot 23, whose wall 24 is formed with an incline 25 at its lower portion. The lower portion of the slot 23 communicates with the oblique slot 26, having the oblique upper wall 27, terminating in the horizontal portion 28. Beyond this horizontal portion are the two oblique slots 29 and 30, which open through the top surface of the plate. 31 designates a solenoid whose core 32 extends upwardly through the frame portion 2 and also through the slot 23 of the slot plate, the latter having the offset 23^a therefor. At its upper end this extension terminates in the hook 33.

The end portion of the lever arm 21 and the hook portion 33, just described, constitute electric contacts for the purpose hereinafter described. In order to further control the circuit of the magnets 16 and 17, I provide the disk 13 with a contact which may be of the form shown in Fig. 9, and which has a continuous rim portion 34 and a semicircular extension 35, formed with the break 36. The brush or contact 37 engages the continuous rim portion 34, and another contact 38 engages the extension 35. As the circuits are arranged in Fig. 9, the contact 38 is connected with one side of the supply circuit for the motor 19, and the brush 37 is connected to the other side of such circuit, through the windings of the magnets 16 and 17.

The winding of the solenoid 31 is also arranged to be connected in series with the windings of the magnets 16 and 17 when the contact is made between the arm 21 and the hook 33, as shown in Fig. 9. The movable core member 32 of the solenoid 31 is provided with a weighted arm, as shown at 39. The lower face of the magnet 17 has a radial slot or groove 40 formed therein, as shown in Fig. 8, the purpose of this being presently described.

In the use of my invention, it is necessary to provide each record A with a central portion or plug 41, of magnetic material. I also preferably provide each record (see Fig. 10) with a leading-in groove 42 for directing the needle into the first active groove of the record, and with a leading-out groove 43, for carrying the needle out of the last active groove of the record to a point which will be at the same distance from the center of the record with all records.

The operation is as follows: A plurality of the records to be played are placed in the holder or magazine for unplayed records. The first record to be played may be either transferred from the magazine or it may be placed by hand upon the disk 3. The latter operation will be assumed. When this record has been played, the reproducer 5 will, by the leading-out groove 43, have been moved to the position shown in full

lines in Fig. 1. At this time, the end of the lever arm 21 comes underneath the hook 33, which closes the electric circuit for the magnets 16, 17 and 31. The energization of the magnet 31 causes it to pull its core downwardly, the hook 33 thereby pulling the end portion of the arm 21 downwardly through the slot 23 and on to the inclined wall 25. As the arm 21 is drawn down on to this inclined wall 25, it will be thereby moved to the right (looking at Figs. 2 and 5) and caused to be disengaged from the hook 33. The pulling down of the arm 21 will rock the reproducer 5 upwardly on its pivot to the position shown in full lines in Fig. 6, and the weight of this reproducer will hold the end of the arm 21 in contact with the oblique slot wall 27. This slot wall acts as a cam under the weight of the reproducer to cause the reproducer and its arm 4 to swing to the position shown in dotted lines in Fig. 1. This dotted position is approximately that required in order to commence playing the ten-inch record, so far as the distance of the needle with respect to the center of the disk 3 is concerned. The reproducer will be left in this position with the end of the arm 21 in engagement with the straight portion 28 of the slot 25 until a new record is brought into place.

While each disk is being played, the contact 38 will be on the break 36 of the contact portion 35, so that the magnets 16 and 17 will then be deenergized. When, however, magnet 31 is energized in the manner described, magnets 16 and 17 will also be energized. These magnets are at this time in the position shown in Fig. 3, the lower magnet 17 engaging the usual record-centering pin of the machine. This engagement holds the arm 14 against movement, although the disk 11 is constantly turning. As soon as the magnets 16 and 17 are energized, magnet 17 attracts the metallic center of the record and the magnet 16 lifts both magnet 17 and the record off from the centering pin. The arm 14 is now free to turn and commences to rotate under the driving action of the friction wheel or disk 11. As soon as the friction wheel or disk 11 begins to turn, the contact 38 will be actively engaged with the contact portion 35, to thereby maintain the energization of the magnets 16 and 17 after their circuit has been broken by the disengagement of the hook 33 from the arm 21. This disengagement deenergizes the magnet 31, and the counterweight 39 raises the hook 33 to its initial position. The arm 14 commences to turn and moves until its end is approximately over the center of the holder for played records. By this time, the contact 38 passes off from the end of the contact portion 35 and deenergizes the magnets 16 and 17. The record is now dropped upon

the holder. In order to insure the record's being removed, notwithstanding the action of any residual magnetism, the said holder 6^b may be provided with the wipers 44. The arm 14 now continues its rotation until its outer end reaches a position over the center of the magazine for unplayed records. When this position is reached, the contact 38 again engages the contact portion 35 and reenergizes the magnets 16 and 17. The uppermost record in the magazine is thereby attracted and lifted from the pin 9. It is for the purpose of accurately centering the record with respect to the pin 9 that I provide the groove 40 in the bottom face of the magnet 17. This groove will engage the centering pin and insure the record's being stopped with its central opening in exact registry with this pin. The continued movement of the arm 14 carries this record over the centering pin of the disk 3, and as this position is reached, the contact 38 passes on to the break 36 of the contact portion 35. At this time, the deenergization of the magnets 16 and 17 will cause the record to be dropped into engagement with the pin, and the magnet 17 will also be engaged with said pin to prevent further movement of the arm 14 during the playing of this record.

As the new record is thus brought into playing position, its edge strikes the needle and moves the reproducer farther away from the center of the record. If the record is a ten-inch record, the reproducer will be moved until the end portion of the arm 21 is in registry with the slot 29 of the slot plate. The weight of the reproducer will then move the arm upwardly through the slot 29 and thus lower the needle into playing position, as the record is dropped to place. If the record is a twelve-inch record, the reproducer will be moved still farther outwardly until the end of the arm 21 is in line with the slot 30 when the needle will be lowered. During this movement the arm will not move upwardly into the slot 29, because the record has not yet been dropped on the centering pin and will, therefore, hold up the member 5. Furthermore, the arm 21 is moved quickly past the narrow mouth of the reversely inclined slot 29. While it may not be necessary to provide the records with the leading-in grooves 42, I prefer to provide such grooves in order to insure a proper playing engagement with the needle of each record.

In order to insure the accurate centering of the records with respect to the centering pin of the record carrier of the phonograph, I may provide a positive stop for stopping the arm 14 at the proper position to bring the opening in the record directly over said pin. Such a form of stop is illustrated in the drawings, and is best

shown in Figs. 3 and 3^a. It consists of an arm 45, which is rigidly secured to the upper end of the post 7, and which extends laterally to a point above the central portion of the record carrier 3. Pivoted to the end of this arm is a cam-shaped pawl 46 capable of a swinging movement limited by the pin 47 and slot 48. 49 designates a pin having a T-head 50, at its lower end and engaging slots in the centering pin 15 and in the upward core extension 17^a of the magnet 17.

As each record is brought over the carrier 3, the magnet 17 is, of course, in its lifted position, and thereby raises the pin 49 into position to engage the pawl 46 in the manner shown in Fig. 3^a, thereby stopping the arm at this point. When the magnets 16 and 17 are deenergized, the pin 49 drops back into the position shown in Fig. 3, and the pawl 46 swings by gravity to a position such that when the magnets are again energized to pick up the played record, the pin 49 will escape said pawl, and the arm will be free to move around with the played record. While this device will not be necessary in all cases, it insures the exact centering of the records as they are dropped to playing position.

The operations just described are repeated for each record which is placed in the magazine for unplayed records, the played records being successively removed and the unplayed records being successively brought into playing position.

The advantages of my invention will be apparent, since it provides a very simple, comparatively inexpensive mechanism which can be readily adapted to existing phonographs and by means of which a plurality of records can be successively played without the necessity for manual interference. The moving parts are few in number and of a character not likely to get out of order. Care should, of course, be taken to properly insulate the electrical connections, these, however, being few in number and simple in character.

I claim:

1. The combination with a phonograph having a rotating risk record carrier, of a holder for unplayed records, another holder for played records, a member mounted to move in a circular path above said carrier and holders, and means carried by said member for engaging and lifting the records, and automatic means for controlling the engagement and disengagement of said means with and from the record, substantially as described.

2. Record-shifting mechanism for phonographs, comprising a movable shifting member, a record-lifting magnet carried thereby and movable therewith, and means controlled by movable parts of the phonograph for actuating said member and for controlling the

circuit of said magnet, substantially as described.

3. Record-shifting mechanism for phonographs, comprising a record-shifting member movable in a circular path, a holder for unplayed records, another holder for played records, both holders being arranged below and adjacent to the path of travel of said arm, a record-lifting magnet carried by said arm, an actuating connection between said member and a constantly moving part of the phonograph, and means controlled by the movement of said member and the phonograph parts for controlling the circuit of said magnet, substantially as described.

4. Record-shifting mechanism for phonographs, comprising a shifting magnet, a movable carrier for said magnet, and means for energizing and deenergizing said magnet at the proper times to pick up and release the records, substantially as described.

5. Record-shifting mechanism for phonographs, comprising a record shifting magnet, a carrier for said magnet movable in a circular path, an actuating connection between the carrier and a movable part of the phonograph, means whereby the carrier is held stationary while a record is being played, and means controlled by the phonograph parts and by the movement of the carrier for controlling the circuit of said magnet, substantially as described.

6. The combination with a phonograph having a rotating disk record carrier, of a holder for unplayed records, another holder for played records, a shifting member mounted to move in a circular path above said carrier, a record-shifting magnet mounted on said member, and another magnet also mounted on the member and arranged to lift the first named magnet, together with means for automatically controlling the circuits of said magnets, substantially as described.

7. The combination with a phonograph having a rotating disk record carrier, of a holder for unplayed records, another holder for played records, a shifting member mounted to move in a circular path above said carrier, a record-lifting magnet mounted on said member, and means for properly centering said magnet with respect to the holder for unplayed records, substantially as described.

8. The combination with a phonograph having a rotating disk record carrier, of a holder for unplayed records, another holder for played records, a shifting member mounted to move in a circular path above said carrier, a record-lifting magnet mounted on said member, and means for centering said member and magnet with respect to said record carrier, substantially as described.

9. The combination with a phonograph having a rotating disk record carrier, of a

holder for unplayed records, another holder for played records, a record-shifting member mounted to move in a circular path above said carrier, a driving connection between said member and the said record carrier, a record-lifting magnet mounted on said member, and means for automatically controlling the circuit of said magnet, together with means for holding said member and magnet in a stationary position while a record is being played, substantially as described.

10. The combination with a phonograph having a rotating disk record carrier and a centering pin, of a horizontally movable record-shifting member, a vertically movable record-lifting magnet, another magnet for lifting the first named magnet, means for automatically controlling the circuit of said magnets, and stop means controlled by the first named magnet for stopping said member in proper position with reference to the centering pin of the phonograph, substantially as described.

11. In record-shifting mechanism for phonographs, a horizontally movable record-shifting member, a record-lifting magnet carried by said member, another magnet also carried by said member and arranged to lift the first named magnet, and means for automatically controlling the circuits of said magnets, substantially as described.

12. Record-shifting mechanism for phonographs, comprising a holder for unplayed records, a record-shifting member movable above said holder, said holder having a centering pin, and a record-lifting magnet carried by said member, said magnet having a centering device arranged to coact with said pin, substantially as described.

13. In record shifting mechanism for phonographs, the combination with a horizontally movable record shifting member, and a shifting magnet carried thereby, of a magazine for unplayed records located below the path of movement of said member and magnet, said magazine having an upwardly pressed support for the records whereby the latter are automatically raised into the plane of action of the magnet; substantially as described.

14. Record-shifting mechanism for phonographs, comprising a horizontally movable shifting member, a record-lifting magnet carried thereby, another magnet for lifting the first named magnet, means for automatically controlling the circuits of said magnets, and means carried by said member for centering a record when lifted by said magnets, substantially as described.

15. In record shifting mechanism for phonographs, the combination with a movable record shifting magnet, and an energizing circuit for said magnet, of circuit closing means operated by the movement of the re-

producer arm of the phonograph to close the circuit of said magnet when a record has been played; substantially as described.

16. In record shifting mechanism for phonographs, the combination of a movable record shifting magnet, a stylus shifting magnet, the two magnets having related energizing circuits, and means controlled by the movement of the stylus carrier for controlling the circuit of the stylus shifting magnet and for partially controlling the circuit of the record-shifting magnet; substantially as described.

17. A composition phonograph record having a portion of magnetic material adapted to cooperate with a record shifting magnet, substantially as described.

18. A composition phonograph record having a central portion of magnetic material adapted to cooperate with a record shifting magnet, substantially as described.

19. The combination with a phonograph,

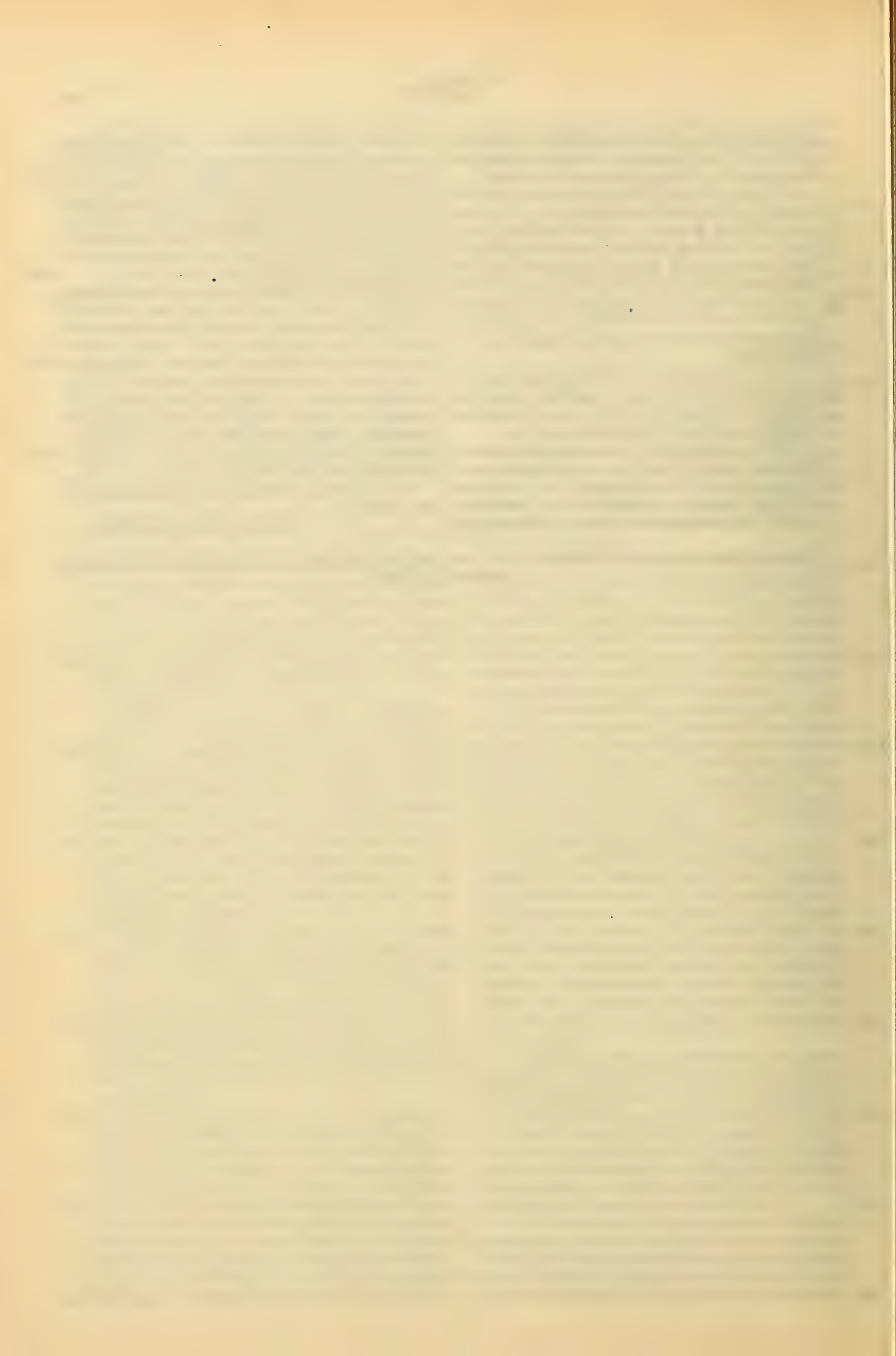
of disk records therefor having magnetic portions, a magnet arranged to attract said records and hold them while being moved into and out of playing position, an energizing circuit for said magnet, means for moving said magnet to transfer the records, and means for controlling the circuits of said magnets; substantially as described.

20. The combination with a phonograph, of disk records therefor having magnetic portions, a magnet arranged to attract said records and hold them while being moved into and out of playing position, an energizing circuit for said magnet, means for moving said magnet to transfer the records, and means for controlling the circuits of said magnets, together with stylus shifting mechanism forming a part of such means; substantially as described.

In testimony whereof, I have hereunto set my hand.

EDGAR E. BROSIUS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



PHONOGRAPH.

1,266,777 ----- N. C. Durand,
Filed Sept. 25, 1914,
Patented May 21, 1918.

N. C. DURAND.
 PHONOGRAPH.
 APPLICATION FILED SEPT. 25, 1914.

1,266,777.

Patented May 21, 1918.

Fig. 1.

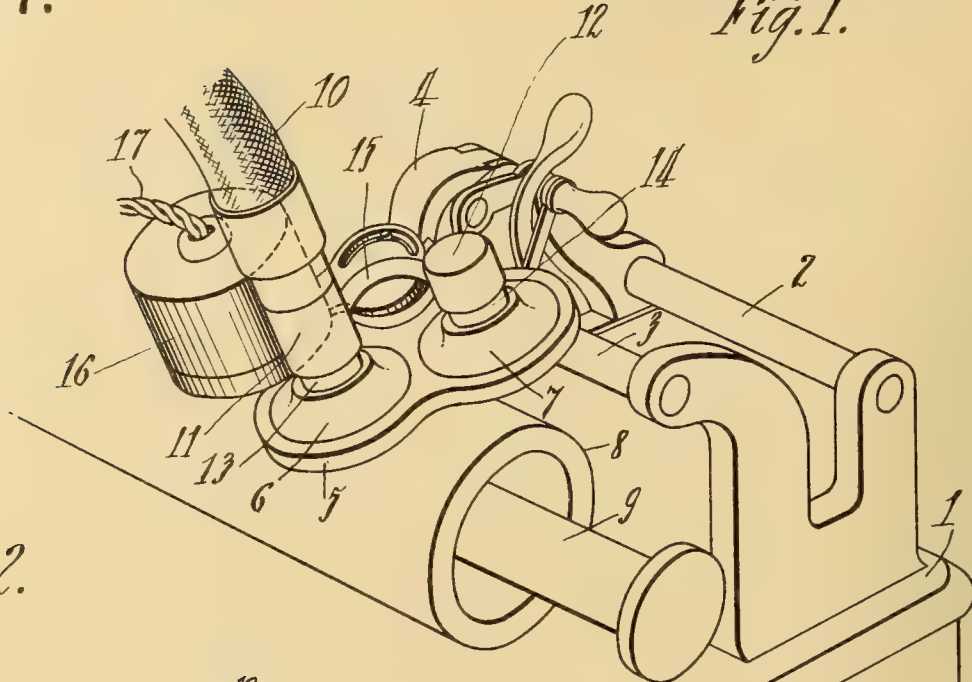


Fig. 2.

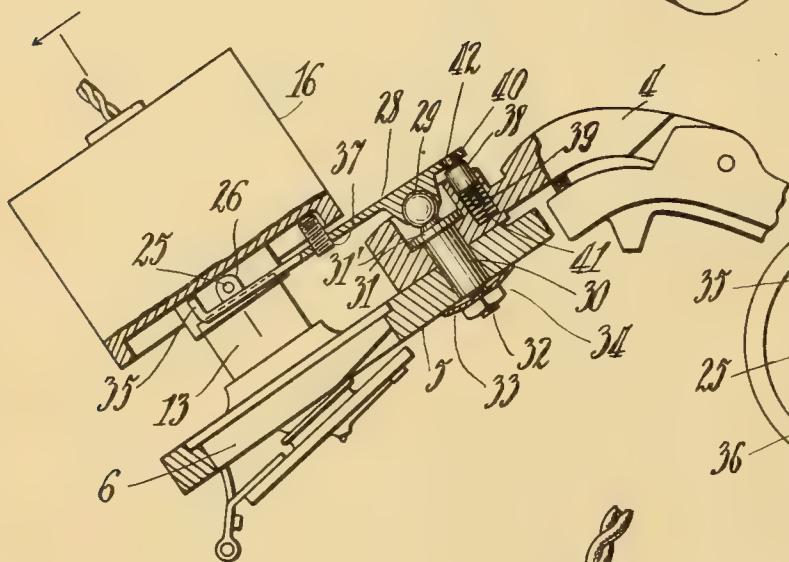


Fig. 3.

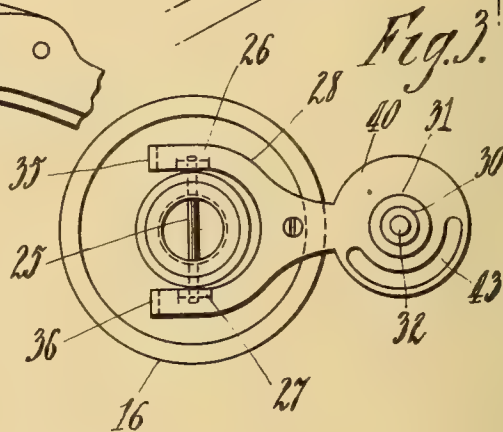
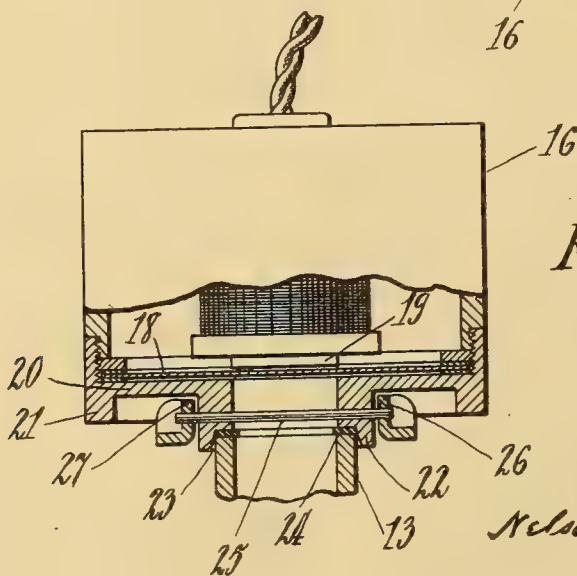


Fig. 4.



WITNESSES

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PHONOGRAPH.

1,266,777.

Specification of Letters Patent.

Patented May 21, 1918.

Application filed September 25, 1914. Serial No. 863,440.

To all whom it may concern:

Be it known that I, NELSON C. DURAND, a citizen of the United States, and a resident of Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Phonographs, of which the following is a description.

My invention relates to phonographs and more particularly to phonographs having telephonic connections whereby sounds from a distant point may be recorded upon a phonograph record blank, one form of such apparatus being disclosed in an application of Newman H. Holland, Serial No. 874,672 filed November 30, 1914.

In accordance with my invention in its preferred form, a telephone receiver in the telephone circuit is so mounted as to be capable of being positioned either in operative relation to an ordinary phonograph recorder so as to cause the latter to record upon the phonograph record blank undulations corresponding to those transmitted to and repeated by the receiver, or out of operative relation with respect to the phonograph recorder so as to permit the use of the latter in the ordinary way without the telephonic connections.

The principal object of my invention is to provide an improved device of the type referred to. Other objects of my invention appear more fully in the following specification and appended claims.

In order that my invention may be more clearly understood, attention is hereby directed to the accompanying drawings forming a part of this specification and in which—

Figure 1 is a fragmentary perspective view showing one embodiment of my invention;

Fig. 2 is a fragmentary view of the same partly in elevation and partly in section;

Fig. 3 is a bottom plan view of the telephone receiver and the support therefor; and

Fig. 4 is a view partly in elevation and partly in section illustrating the telephone receiver seated upon the neck of the phonograph recorder.

In all of the views, like parts are designated by the same reference numerals.

The phonograph shown is of the Edison type and comprises the usual body 1 having a back rod 2 and a guide rod 3, on which rods the traveling carriage 4 is slidably mounted. Pivotaly mounted on the forward end of the carriage 4 is a frame 5 supporting a recorder 6 and a reproducer 7, the pivotal movement of this frame permitting either the recorder or the reproducer to be brought into operative position with respect to the record cylinder or blank 8 mounted on the rotatable mandrel 9. As shown in Fig. 1, the phonograph is arranged for recording in the usual manner. This figure shows the ordinary hollow speaking tube 10 provided with a sleeve 11 and a cap 12 seated respectively on the straight recorder neck 13 and the reproducer neck 14, which necks extend axially with respect to the recorder 6 and the reproducer 7 respectively. The necks 13 and 14 have constricted openings communicating with and smaller than their sound boxes and are of substantially uniform diameter. A hollow tubular connection 15 joins the cap 12 to the sleeve 11, so that by moving the reproducer into operative position with respect to the record cylinder, the sound vibrations set up by the reproducer may be conveyed to the operator through the tube 10. The sleeve 11 and cap 12 may be readily lifted from the recorder and reproducer necks to detach the speaking tube from the phonograph.

The telephonic sound box or receiver 16 is connected to the telephone circuit by means of the wires or conductors 17 and is provided with the usual diaphragm 18 adapted to be vibrated by the usual magnet 19. The lower portion of the receiver is closed by an annular plate 20 having a peripheral flange 21 and an outwardly extending central neck or collar 22 having a constricted opening relatively smaller than and communicating with the interior of the sound box 16. The neck 22 is provided at its lower end with a recess 23 adapted to receive the recorder neck 13, the side walls of the recess 23 tapering downwardly and out-

wardly so as to permit the ready positioning of the telephone receiver over the neck of the recorder. An annular washer 24 of rubber or other yielding material arranged at the bottom of the recess 23 in the telephone receiver is secured to the latter, as by any suitable cement. The washer 24, as shown in Fig. 4, is arranged to be positioned between the neck 22 of the telephone receiver and the neck 13 of the phonograph recorder when the said receiver and recorder are in operative relation with respect to each other so as to produce an air tight connection between the said receiver and recorder.

Extending loosely through the center of the neck 22 is a pin 25, the ends of which are secured in ears or lugs 26 and 27 which are integral with and extend upwardly from the sides of a bracket member 28. The said bracket member is connected by a ball and socket joint 29 to a pin or stud 30 by which the bracket and the parts carried thereby may be secured to the traveling carrier arm 4. The stud 30, as shown in Fig. 2, passes through both the arm 4 and the frame 5 and serves not only to connect the bracket 28 to the arm 4 but also to pivotally connect the frame 5 to the said arm. The stud 30 is provided with a flange-like portion 31 seated in the bottom of a recess 31' formed in the top of the arm 4, the lower portion of the stud 30 being formed with a threaded portion 32 of reduced diameter which is surrounded by a spring washer 33 arranged to be held in engagement with the lower surface of the frame 5, as by a nut 34 threaded on the part 32. It will be seen that the hereinbefore described mounting of the receiver 16 is such that it may be readily applied to phonographs now in use by securing the pivot 30 in the place of the ordinary pivot connection between the frame 5 and the arm 4. With the said mounting, the telephone receiver is movable universally about the joint 29, so that it may be lifted and readily moved laterally from the inoperative position shown in Fig. 1 over and then down upon the neck of the phonograph recorder, into the position shown in Figs. 2 and 4, after which it may again be lifted from operative position and moved laterally and downwardly to the position shown in Fig. 1. The pivot 25 permits the oscillation of the receiver 16 forwardly and backwardly with respect to the bracket 28 and thereby permits the receiver to seat itself accurately upon the neck 13 of the phonograph recorder. The forward movement of the receiver about pivot 25 is limited by engagement of the plate 20 with the stops 35 and 36 which are integral with and project upwardly from the forward end of the bracket 28. A pin 37 threaded through the bracket 28 to the rear of the pivot 25 is arranged to

engage the lower surface of the plate 20 to limit the rearward movement of the receiver 16 about the said pivot. By adjustment of the screw 37, the amount of forward and backward movement of the receiver 16 with respect to bracket 28 may be regulated at will. To insure the holding of the telephone receiver firmly in engagement with the neck of the phonograph recorder, I provide a pin 38 seated in a cylindrical recess 39 which is arranged in the top of the arm 4, to the rear of the stud 30, said pin being pressed upwardly against the lower surface of a circular enlargement 40 on the bracket 28 by a spring 41 located in the bottom of recess 39. It is understood that the weight of the receiver 16 and the bracket 28 tends to a certain extent to hold the said receiver in engagement with the recorder neck 13. The upper end of the pin 38 is provided with a projection 42 arranged in an arcuate slot 43 formed in the enlargement 40 concentric with the axis of the stud 30, the projection 42 being arranged to engage the ends of the slot 43 to limit the lateral movement of the bracket 28 and the receiver 16.

In view of the foregoing, it will be seen that my invention permits the ready moving of two sound boxes, such as the telephone receiver and phonograph recorder referred to into and out of operative position with respect to each other, the use of the phonograph in the ordinary way not being interfered with when the telephone receiver is in inoperative position. Also as heretofore explained the invention can be readily applied to phonographs now in use.

While I have shown a preferred embodiment of my invention, numerous changes may be made in the said embodiment without departing from the spirit of my invention.

What I claim as new and desire to protect by Letters Patent of the United States is as follows:

1. The combination of sound boxes having constricted openings and a mounting for one of said sound boxes permitting movement thereof relatively to the other to place said openings into or out of register with each other, substantially as described.

2. The combination of sound boxes having constricted openings and a mounting for one of said sound boxes permitting movement thereof in a plane parallel with the plane of the opening in the other to place said openings in or out of register with each other and permitting movement thereof in a direction perpendicular to said plane to place said openings into or out of close proximity to each other, substantially as described.

3. The combination of a hollow sound box having a substantially straight hollow neck

extending axially therefrom and having an opening at its end, a second sound box having an opening, and a supporting member for one of said sound boxes, said member
5 being movable to permit the placing of said openings into and out of register with each other, the sound box supported by said member being movable relatively thereto to permit it to seat itself accurately upon the other
10 sound box, substantially as described.

4. The combination of a plurality of sound boxes, one of which is adapted to cause the operation of the other, and means comprising a ball and socket joint for mounting one
15 of said sound boxes for universal movement to permit movement of said sound box into and out of operative relation with respect to the other sound box, substantially as described.

20 5. The combination of a plurality of sound boxes, one of which is adapted to cause the operation of the other, and means for mounting one of said sound boxes for universal movement to permit movement of
25 said sound box into and out of operative relation with respect to the other sound box, substantially as described.

6. The combination of a plurality of sound boxes, a movable supporting member
30 for one of said sound boxes, said member being mounted to permit said sound box to be moved toward and away from the other sound box and said first named sound box being movable with respect to said member
35 in a direction transverse to the direction of movement of said member, and means for limiting the movement of the first named sound box with respect to said member, substantially as described.

40 7. The combination of a plurality of sound boxes, a movable supporting member for one of said sound boxes, said member being mounted to permit said sound box to be moved toward and away from the other
45 sound box and said first named sound box being movable with respect to said member in a direction transverse to the direction of movement of said member, and adjustable means for limiting the movement of the first
50 named sound box with respect to said member, substantially as described.

8. The combination of a plurality of sound boxes one of which is adapted to cause the operation of the other, one of said sound
55 boxes being movable into and out of operative relation with respect to the other, and means tending to move one of said sound boxes toward the other to hold said sound boxes in operative relation to each other,
60 substantially as described.

9. The combination of a plurality of sound boxes one of which is adapted to cause the operation of the other, one of said sound boxes being movable into and out of opera-

tive relation with respect to the other, and 65
spring pressed means tending to move one of said sound boxes toward the other to hold said sound boxes in operative relation to each other, substantially as described.

10. The combination of a frame and a 70
plurality of sound boxes mounted thereon and relatively movable into engagement with each other, one of said sound boxes being biased to move into engagement with the other in certain positions, substantially 75
as described.

11. The combination of a plurality of sound boxes one of which is adapted to cause the operation of the other, one of said sound boxes being movable into and out of opera- 80
tive relation with respect to the other, and yielding means arranged to lie between said sound boxes when the latter are in operative relation with respect to each other, substantially as described. 85

12. The combination of a plurality of sound boxes one of which is adapted to cause the operation of the other, one of said sound boxes being movable into and out of operative relation with respect to the other, and 90
means for forming an air tight joint between the interiors of said sound boxes when the latter are in operative relation with respect to each other, substantially as described. 95

13. The combination of a frame, a plurality of sound boxes mounted upon said frame, movable relatively to each other into engagement and providing a tight joint between them, substantially as described. 100

14. The combination of a frame having a sound box, a member movably mounted upon said frame and a sound box mounted upon said member whereby said sound boxes can be moved into engagement with each other 105
providing a tight joint between them, said last mentioned sound box being adjustably mounted upon said member so that it can be properly engaged with said first mentioned sound box, substantially as described. 110

15. The combination of a frame having a sound box, a member universally mounted upon the frame and a sound box movably mounted upon the member and movable into and out of operative relation with respect 115
to the first sound box, substantially as described.

16. The combination of a frame, a sound box having a neck and mounted on the frame, a member universally mounted upon 120
the frame, and a sound box pivoted upon said member and biased to move into engagement with said neck when moved near the same, substantially as described.

17. The combination of a frame having a 125
sound box thereon provided with a neck, a member pivoted to said frame on an axis extending parallel with said neck, provided

with a sound box having an opening and swingable to bring said sound boxes in alignment with the neck of said first mentioned sound box interfitting into the opening of
5 the last mentioned sound box, substantially as described.

18. The combination of a frame, a sound box mounted on said frame and a mounting having a sound box and permitting said last
10 mentioned sound box to be moved in aline-

ment with the first mentioned sound box and then swung into interfitting engagement therewith, substantially as described.

This specification signed and witnessed this 23rd day of September, 1914.

NELSON C. DURAND.

Witnesses:

FREDERICK BACHMANN,
MARY J. LAIDLAW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

BALANCED HINGED TOP FOR CABINETS AND OTHER
RECEPTACLES.

1,266,834 ----- T.C.Linn, Jr., and J.P. Butt, Jr.,
Filed Apr. 18, 1917,
Patented May 21, 1918.

T. C. LINN, JR. & J. P. BUTT, JR.
BALANCED HINGED TOP FOR CABINETS AND OTHER RECEPTACLES.
APPLICATION FILED APR. 18, 1917.

1,266,834.

Patented May 21, 1918.

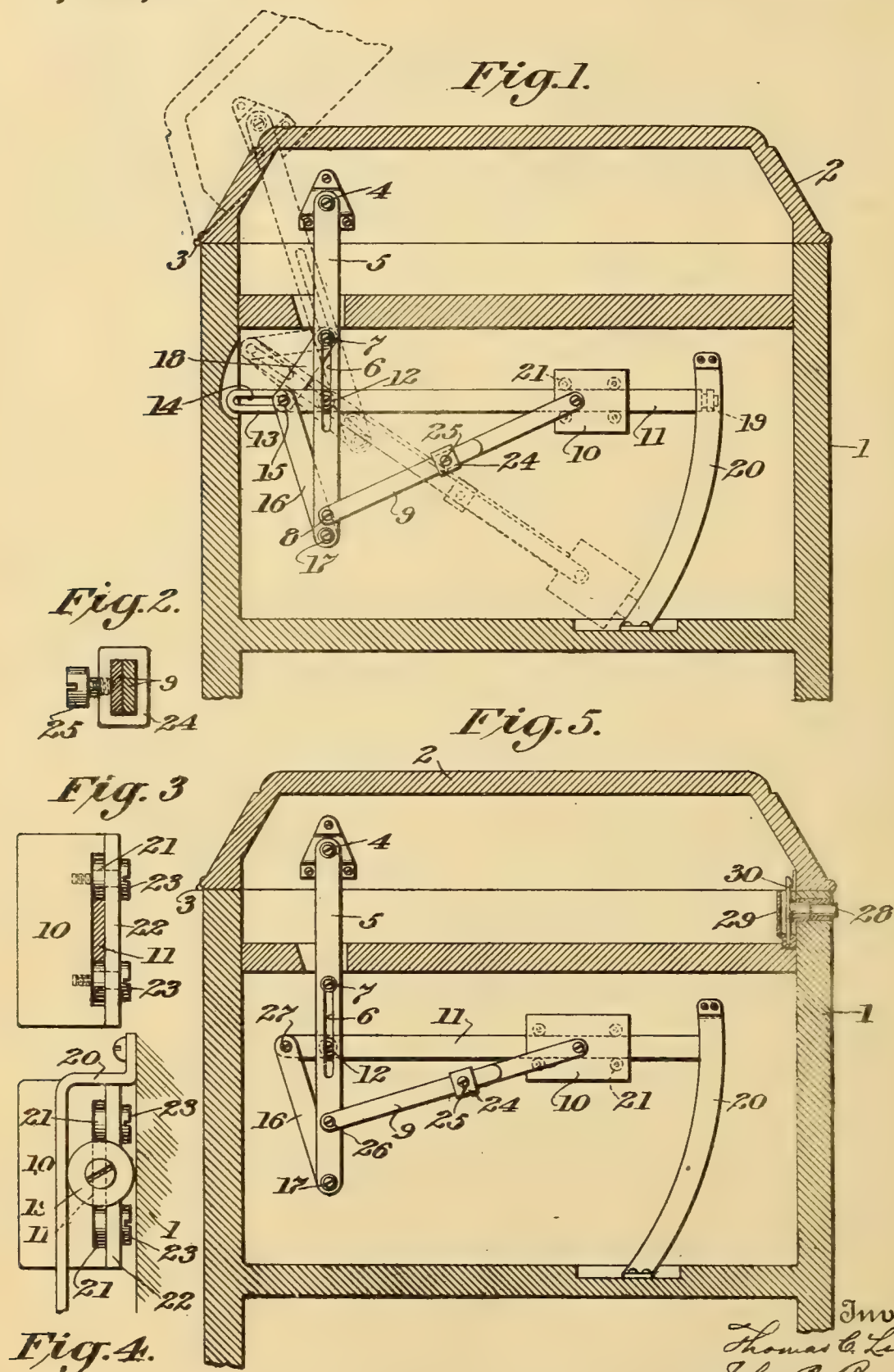


Fig. 4.

Inventors.
Thomas C. Linn Jr.
John P. Butt Jr.
by *M. H. Finckel*
Attorney

UNITED STATES PATENT OFFICE.

THOMAS C. LINN, JR., OF SALISBURY, NORTH CAROLINA, AND JOHN P. BUTT, JR., OF GETTYSBURG, PENNSYLVANIA.

BALANCED HINGED TOP FOR CABINETS AND OTHER RECEPTACLES.

1,266,834.

Specification of Letters Patent. Patented May 21, 1918.

Application filed April 18, 1917. Serial No. 162,901.

To all whom it may concern:

Be it known that we, THOMAS C. LINN, Jr., a citizen of the United States, residing at Salisbury, in the county of Rowan and State of North Carolina, and JOHN P. BUTT, Jr., a citizen of the United States, residing at Gettysburg, in the county of Adams and State of Pennsylvania, have invented a certain new and useful Improvement in Balanced Hinged Tops for Cabinets and other Receptacles, of which the following is a full, clear, and exact description.

It is sometimes desirable to provide cabinets and other receptacles with a hinged or pivoted top which will remain fully open or closed or in any intermediate position without the aid of a manually operated prop. This is especially desirable in connection with graphophone or phonograph cabinet tops, where it is necessary to have the top remain in a raised position for the changing of records and needles, etc., particularly where the operator desires to use only one hand for performing these acts. Most of the devices for holding cabinet tops in a raised position with which we are familiar, comprise a prop, hinged to the top, and having a slotted and notched free end which coöperates with a stop or catch on some part of the cabinet body, and in order to lower the top when such a prop is used, it is necessary to release the prop with one hand and lower the top with the other. This is sometimes inconvenient, because of one hand being occupied, as is often the case, with the manipulation of a graphophone, in holding the record which has just been removed from the machine.

The object of the invention is to eliminate the above-mentioned disadvantages, and to provide cabinet and other receptacle tops with a device which will support the top in any position without the use of a prop, such as referred to.

The invention consists in a hinged top for cabinets and other receptacles, provided with a weight-controlled lever mechanism so designed as to be capable of balancing the weight of the top to support it in fully open or closed position, or in any intermediate open position, or, when suitably adjusted, to cause the top to be automatically opened upon the release of a suitable detent, all as we will proceed now to explain and finally claim.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a vertical transverse section of a cabinet, such as used to contain a graphophone or phonograph, showing the top-operating device of the invention. Fig. 2 is a sectional elevation showing the weight adjusting means; Fig. 3 is an end view of the weight showing its roller mounting on the balance arm, and Fig. 4 is an end view of the balance arm showing its guide roller and track, all on a larger scale. Fig. 5 is a view similar to Fig. 1, showing a modification of the mechanism whereby the top may be automatically raised.

1 is the upper portion of the body of a cabinet or other receptacle, and 2 is the top, hinged in any usual or approved manner to the body, as at 3.

Pivoted to the top at 4 is a lifting rod 5, provided with a slot 6, which coöperates with a pivot 7 fixed to the body 1. The lower end of the rod 5 is connected at 8 by a link 9 with a weight 10 mounted to travel upon a balance arm 11, which is pivoted at 12 to the body, and is provided with an extension 13 having a slot 14 by which it is operatively connected at 15 by a link 16 with the rod 5, as at 17. A link 18 pivoted at 7 and connected at 15 with link 16 compensates by means of slot 14 and link 16 for the force exerted by weight 10 as the top rises.

The outer end of the balance arm 11 is provided with a roller 19 which coöperates with a guide or track 20 suitably secured to the body 1 to relieve the pivot 12 of lateral strain.

The weight 10 should be mounted to travel freely upon the arm 11, and one means for so mounting it is shown in Fig. 3, wherein rollers 21 are provided on the weight to contact with said arm, and the weight is held in operative relation to the arm by means of a plate 22 attached to the weight by cap screws 23 which also acts as axes for the rollers 21.

In order to compensate for variations in weight of the tops of cabinets to which this device may be applied, it is necessary to provide for adjustment of the weight 10 on the arm 11 toward and away from the pivot 12, and to this end the link 9 may be formed in two parts, adapted to slide one upon the other, and the two parts are connected by

means of a collar 24 provided with a suitable set-screw 25; but it is obvious that other means may be used for shortening or lengthening the link 9.

5 The operation of the device is as follows:—The weight 10 is adjusted by means of link 9, to a position on arm 11 at which it exactly balances the weight of the top 2. As the top is raised, the rod 5 turns upon
10 its pivot 7, while sliding upward by means of slot 6, and through link 9 moves weight 10 outwardly upon arm 11 in a given ratio and at the same time link 16 is caused to swing out in a slot 14 by the pivotal action
15 of link 18 in a given ratio, and the combination of the two ratios so diminishes the force exerted by the weight 10 that the weight is always in balance with the weight of the top and will hold the top in either
20 closed position, as shown in full lines in Fig. 1, or in extreme open position as shown in dotted lines, or in any intermediate open position desired.

In some cases it might be desirable to
25 have the top rise automatically upon releasing a spring catch or other detent, and Fig. 5 shows a modification of the invention by which this result may be accomplished. In this form, the rod 5 is used as before, but
30 the connection 26 of link 9 is raised to a point farther away from its lower end. This decreases the travel of weight 10 on arm 11. Also, link 16 is connected directly and fixedly with arm 11 at 27 and link 18
35 is dispensed with. With this arrangement, it will be seen that when the button 28 is pressed, it releases spring catch 29 from detent 30 and allows weight 10 to exert its force through arm 11, link 16 and rod 5 to
40 raise the top.

Variations in details of construction and arrangement of parts are within the spirit of the invention and the scope of the appended claims.

45 What we claim is:—

1. In a balanced hinged top for receptacles, the combination with said top of a lifting rod pivoted intermediate its ends and connected with said top, a balance arm,
50 and means connecting said rod and arm whereby said arm is always in balance with said top.

2. In a balanced hinged top for receptacles, the combination with said top of a
55 lifting rod, a pivoted arm, a counterbalance weight slidably mounted on said arm, and means connecting said rod, arm and weight, whereby said weight always balances said top.

3. In a balanced hinged top for receptacles, the combination with said top of a
60 lifting rod pivoted thereto and having a sliding connection with said receptacle, a pivoted arm carrying a traveling weight, and links connecting said rod, arm and
65 weight, whereby said top is always balanced.

weight, whereby said top is always balanced.

4. In a balanced hinged top for receptacles, the combination with said top of a
70 slotted lifting rod having a sliding and pivotal connection with said receptacle, an arm pivoted on said receptacle and carrying a traveling weight, and links connecting said rod and weight and said rod and arm,
75 whereby said weight will balance said top in all positions.

5. In a balanced hinged top for receptacles, the combination with said top of a
80 lifting rod adapted to have a limited sliding movement on a pivot on said receptacle, an arm pivoted to said receptacle and having a slotted portion, a weight mounted to travel on said arm, and means whereby said weight and top are balanced, comprising an
85 adjustable link connecting said rod and weight, a link connecting said rod and arm, and means for causing said latter link to travel in the slotted portion of said arm as the top is moved.

6. In a balanced hinged top for receptacles, the combination with said top of a
90 slotted lifting rod having a sliding and pivotal connection with said receptacle and connected with said top, a slotted arm pivoted on said receptacle and carrying a traveling
95 weight, a link connecting said rod and arm, a link connecting said rod and weight, means to cause said arm connecting link to move away from the pivot of said arm when the
100 top is raised, and means on said weight connecting link for adjusting said weight with relation to the pivot of said arm.

7. In a balanced hinged top for receptacles, the combination with said top of a
105 slotted lifting rod having a sliding and pivotal connection with said receptacle, an arm pivoted on said receptacle and carrying a traveling weight, links connecting said rod and weight and said rod and arm, whereby
110 said weight will balance said top in all positions, and a guide for said arm.

8. In a balanced hinged top for receptacles, the combination with said top of a
115 slotted lifting rod having a sliding and pivotal connection with said receptacle, an arm pivoted on said receptacle and carrying a traveling weight, links connecting said rod and weight and said rod and arm, whereby
120 said weight will balance said top in all positions, and a roller on said arm to coöperate with a guide on said receptacle.

9. In combination, a hinged top, a lifting rod pivoted intermediate its ends and connected with said top, a balance arm, and
125 means connecting said rod and arm.

10. In combination, a hinged top, a lifting rod, a pivoted weighted arm, and means connecting said rod and arm on opposite
sides of the pivot of said arm.

11. In combination, a hinged top, a lifting 130

rod, an arm having a weight adapted to travel thereon, means connecting said rod and arm, and means connecting said rod and weight.

5 12. In combination, a hinged top, a lifting rod, an arm having a weight mounted to travel thereon, a link connecting said rod and arm, and an adjustable link connecting said rod and weight.

10 13. The combination with a hinged top, of a lifting rod pivoted thereto and hanging therefrom, a fixed pivot with which said rod has a slotted connection, an arm arranged crosswise of the lifting rod and piv-
15 oted nearer one end than the other, a link connecting the shorter end of the arm with the lower end of the rod, a weight slidably mounted on the longer end of the arm, and a link connecting said weight and the lower
20 portion of the rod.

14. The combination with a hinged top,

of a lifting rod pivoted thereto and hang-
ing therefrom, a fixed pivot with which
said rod has a slotted connection, an arm
arranged crosswise of the lifting rod and 25
pivoted nearer one end than the other and
provided with a longitudinal slot in its
shorter end, a link pivoted to the lifting
rod pivot, a link pivoted to the lower end
of the lifting rod, means connecting said 30
links in the slotted end of the arm, a sliding
weight on the longer end of the arm, and
a link connecting said weight and lifting
rod.

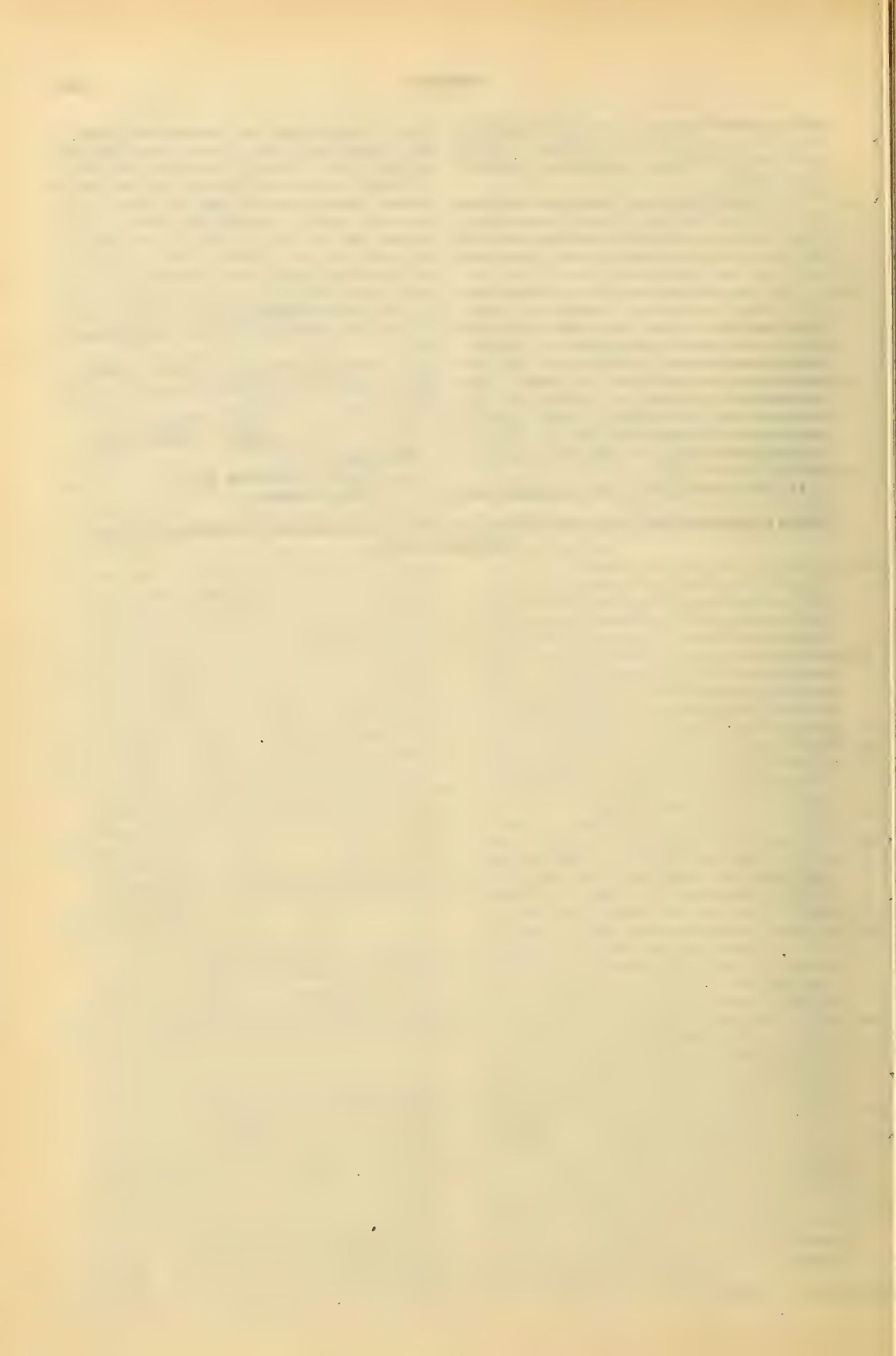
In testimony whereof we have hereunto 35
set our hands this 17 day of April A. D.
1917.

T. C. LINN, JR.
JOHN P. BUTT, JR.

Witnesses:

LENSIN CHAMBERS, Jr.,
F. S. BUCKLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."



UNITED STATES PATENT OFFICE.

ROSCOE C. JOHNSTON, OF ST. LOUIS PARK, MINNESOTA, ASSIGNOR OF ONE-HALF TO
EMIL NELSON, OF MINNEAPOLIS, MINNESOTA.

PROCESS OF MAKING PHONOGRAPH-NEEDLES.

1,266,949.

Specification of Letters Patent.

Patented May 21, 1918.

No Drawing.

Application filed May 5, 1917. Serial No. 166,644.

To all whom it may concern:

Be it known that I, ROSCOE C. JOHNSTON, a citizen of the United States, residing at St. Louis Park, in the county of Hennepin and State of Minnesota, have invented a new and useful Process of Making Phonograph-Needles, of which the following is a specification:

The process forming the subject matter of this application, is adapted to be employed in the preparation of a non-metallic reproducing needle for phonographs, whether the needle be made of wood or of bone.

The invention aims, further, and specifically, to provide a novel process for treating a bone needle.

It is the object of the invention to produce a non-metallic needle of the kind above mentioned which will not injure the record, the process producing a needle which will stand a greater amount of wear than has been possible heretofore, without resharpening.

With the above and other objects in view, the invention consists in the process hereinafter described, and in the various steps thereof, it being understood that, within the scope of what is claimed, changes may be made without departing from the spirit of the invention.

This invention contemplates the treatment of a hard wood needle. Although the process may be used to advantage in treating many different kinds of wood, and in particular in treating many kinds of hard wood, in the making of phonograph needles, it is of peculiar utility in connection with a needle made of English or American box wood, it having been ascertained by experiment, that the grain of English or American box wood differs from the grain of other hard woods sufficiently to render box of peculiar utility, notably when employed in connection with the process hereinafter described.

In putting the present invention into practice, a hard wood needle of any desired shape is immersed in a siccative oil, or is otherwise treated therewith. In practice, it is preferable to immerse the needle in the oil, and the oil, preferably, is at boiling temperature. Linseed oil is peculiarly efficient for the ends in view and, after the needle has been immersed in boiling linseed oil for a varying period of time, ordinarily about thirty minutes, the needle is removed

from the boiling oil and is dried. The needle may be permitted to dry in the air at the prevailing atmospheric temperature, but, under some conditions, depending upon the particular character of the wood which has been treated, it may be desirable to bake the needle slowly in an oven, at a low oven temperature. The length of time that the needle is baked, if it is found desirable to bake the needle, will vary, but ordinarily, the baking step is carried on for a period of about two hours.

A needle produced by the process above described will give a medium tone of peculiar distinctness and clarity. A needle produced by this process will not injure the record and may be used many times without resharpening.

The oil fills the pores of the needle, and when hardened by drying, either at atmospheric temperature or in an oven, results in the production of a needle having the characteristics hereinbefore set forth.

The invention contemplates the treatment of a phonograph needle made of bone. It has been proposed heretofore, to subject a bone needle to the action of a dilute acid, such as hydrochloric acid, for the purpose of removing the earthy salts, and then treating the needle with a grease or oil (not a siccative oil like linseed oil) for the purpose of lubricating the needle. Such a process creates a needle differing materially from the needle made by the process hereinafter described. By treating a bone needle with a weak acid, the earthy salts are removed but, further and unavoidably, the physical characteristics of the bone are changed, depriving the bone of many of the properties which render it of use as a sound reproducing medium. Further, the use of a lubricating grease, such, for instance, as sperm oil, produces results differing radically from those brought about when a drying oil like linseed oil is employed, and notably if the bone stylus has first been treated with an acid, as hereinbefore described.

In carrying out the process constituting a part of the present application, a bone needle is first immersed in a weak alkaline bath, preferably consisting of lye water, which is strong enough to extract the oil and fatty matter from the bone. The lye water bath may be either cold or hot, and the period of immersion may vary. If a bone needle is

immersed for a period of approximately one hour in a cold alkaline bath, consisting of weak lye water, one step of the process will have been fulfilled, although the temperature of the alkaline bath and the period of immersion may be varied.

Subsequently, the bone needle is immersed in hot water, and preferably boiling water, to clean the pores of the needle from the alkali. The needle may remain in the boiling water for a period of time which will be dictated by the strength of the alkaline solution, and the experience of the operator. Ordinarily, if the needle is kept in boiling water for a half hour, the cleaning of the process will have been completed.

After the needle has been immersed in boiling water, it may or may not be dried. Ordinarily, this drying step is not necessary, the needle being placed immediately in a boiling siccative oil, such as linseed oil, and being kept in the boiling oil for a period approximating one hour.

Finally, the needle is dried, either at atmospheric temperature or in a slow oven at a comparatively low oven temperature. Two hours of baking will be sufficient under average conditions.

A bone needle treated according to the process above described produces a medium tone which is clear and distinct. The needle will not injure the record and it will wear well, and will be found to differ materially, so far as results are concerned, from a bone needle which has been treated with acid and subsequently with a lubricating oil such as sperm oil.

Having thus described the invention, what is claimed is:—

1. Steps in the process of preparing a non-metallic, reproducing, phonograph needle, which steps consist in treating the needle with a siccative oil, and drying the needle after such treatment.

2. The hereindescribed process of preparing a bone-reproducing phonograph needle, which consists in treating the needle with a weak alkaline solution, and then treating the needle with a siccative oil.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ROSCOE C. JOHNSTON.

Witnesses:

LYNN FOX,
N. D. BESSENY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH.

1,267,059 ----- C. B. Cole,
Filed Apr. 14, 1916,
Patented May 21, 1918.

O. B. COLE.

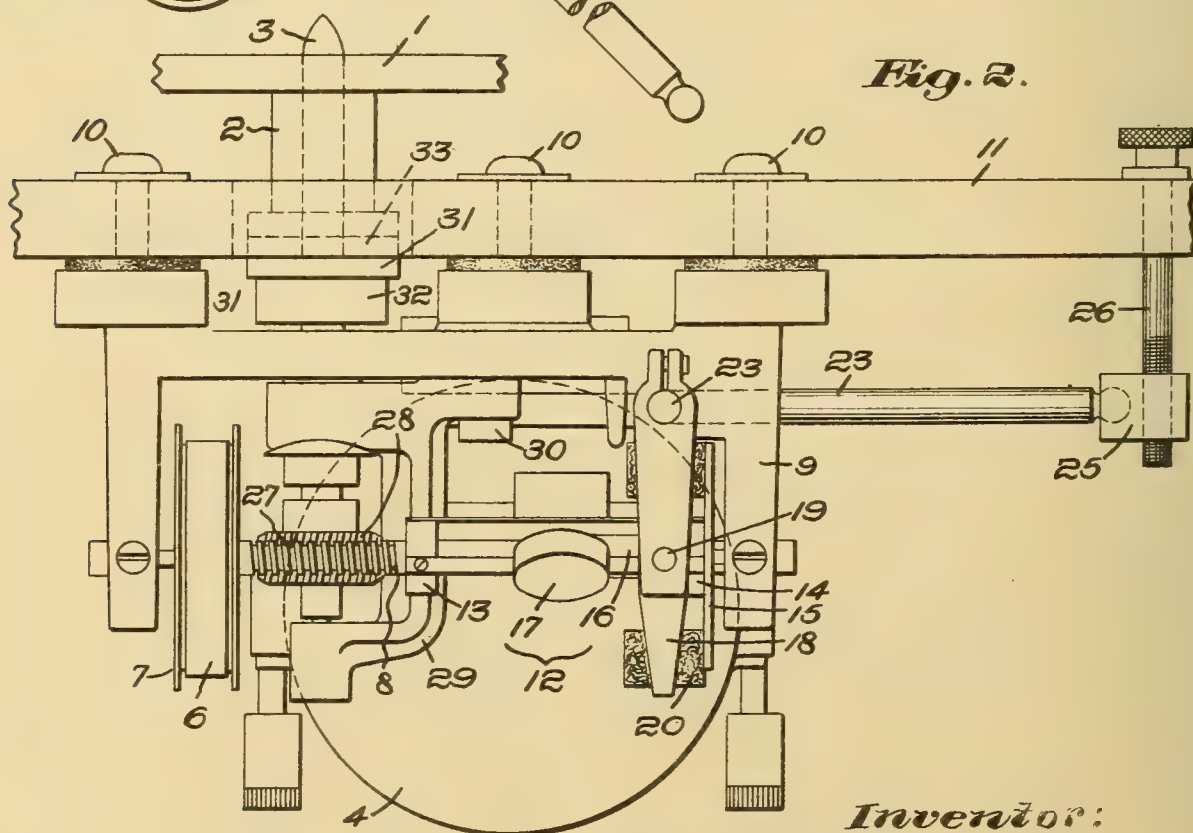
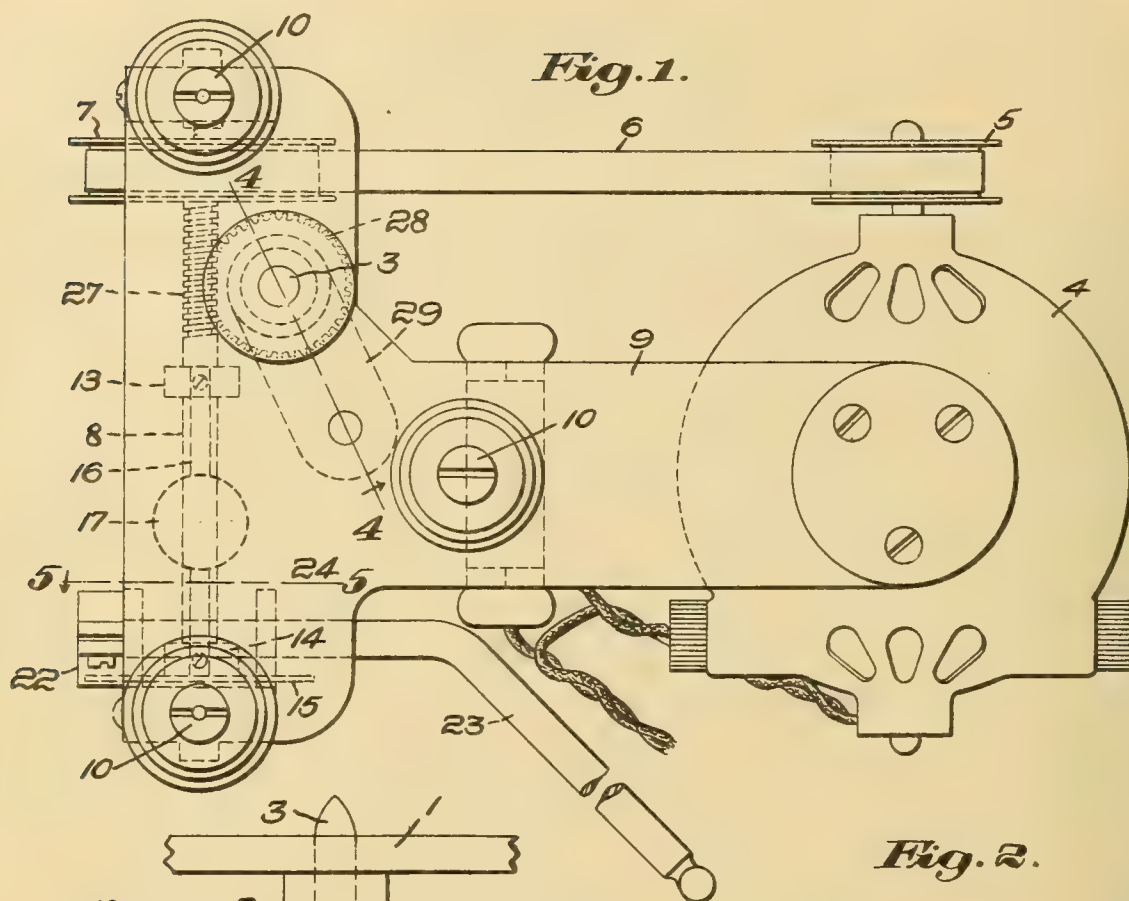
PHONOGRAPH.

APPLICATION FILED APR. 14, 1916.

1,267,059.

Patented May 21, 1918.

2 SHEETS—SHEET 1.



Inventor:
Otto B. Cole,
by *Emory, Booth, Jamney & Varney*
Attys.

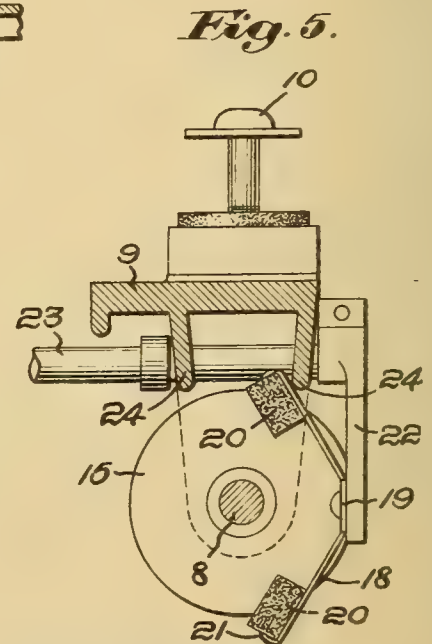
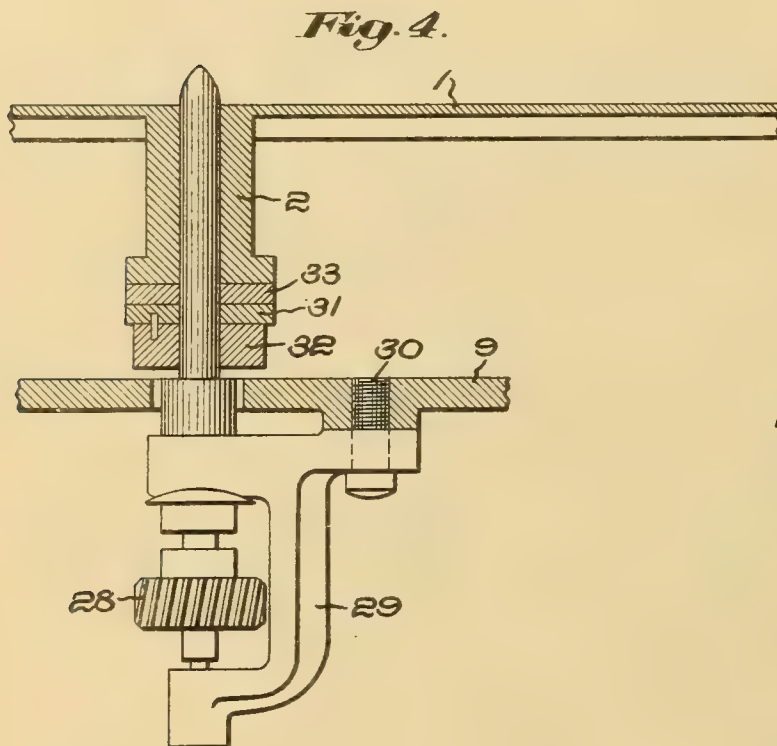
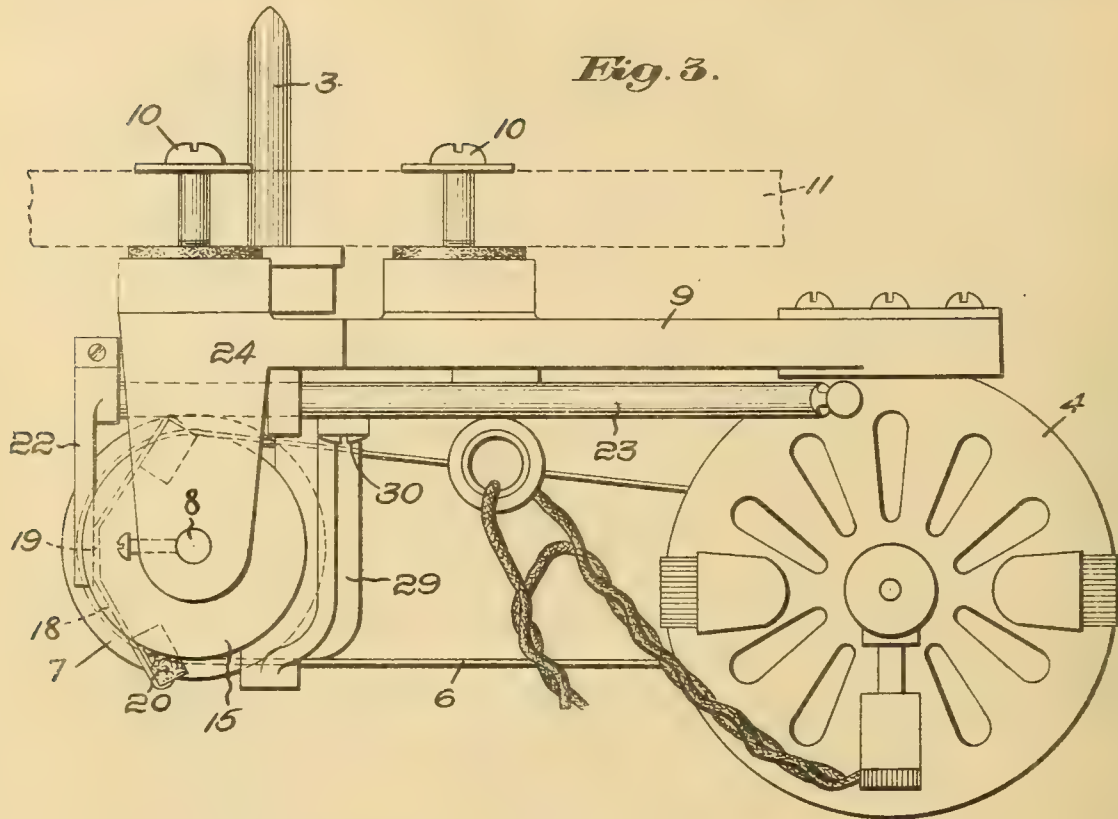
O. B. COLE.
PHONOGRAPH.

APPLICATION FILED APR. 14, 1916.

1,267,059.

Patented May 21, 1918.

2 SHEETS—SHEET 2.



Inventor:
Otto B. Cole,
by Emory, Booth, Jamney & Varney
Attys

UNITED STATES PATENT OFFICE.

OTTO B. COLE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO ARION MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

PHONOGRAPH.

1,267,059.

Specification of Letters Patent.

Patented May 21, 1918.

Application filed April 14, 1916. Serial No. 91,209.

To all whom it may concern:

Be it known that I, OTTO B. COLE, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Phonographs, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to phonographs and its more particular purpose is to improve the means whereby the record support is moved. In order that my invention may be clearly understood, I shall herein describe a specific embodiment which I have illustrated in the accompanying drawings showing it as applied to a machine of the type wherein the record is a flat disk. While my improvements are adapted for machines utilizing various forms of motive power, I consider them to be particularly advantageous in connection with a machine driven electrically and therefore I shall use such machine as an example of my invention for the purposes of this specification.

Referring to the drawings wherein an embodiment of my invention is illustrated in detail:

Figure 1 is a top plan of the driving mechanism.

Fig. 2 is a side elevation of the same in place in the phonograph as seen from the left of Fig. 1, the record support being in place but shown partly broken away;

Fig. 3 is a side elevation as seen from the bottom of Fig. 1;

Fig. 4 is a section on line 4—4 of Fig. 1, a part of the record holder being shown also and in central section; and

Fig. 5 is a section on line 5—5 of Fig. 1.

The phonograph mechanism chosen for illustration, as shown in Fig. 2, comprises a record support 1 formed with a hub member or sleeve 2 adapted to fit over the driving spindle 3. This spindle is driven from a motor 4, herein shown as an electric motor, by means of a suitable train of mechanism, an example of which is herein illustrated and which I will now proceed to describe in detail.

The armature of the motor 4 carries the pulley 5 connected by means of a belt 6 to the pulley 7 fastened on the power shaft 8, which is suspended in suitable bearings in

the hanger 9 secured to the under side by the screws 10 of the top wall 11 of the cabinet of the phonograph. I prefer to utilize a belt 6 or equivalent frictional transmission device as it permits the armature or rotor of the motor to spin idly if the power shaft 8 is stopped or retarded in any manner. Therefore, it is unnecessary to employ a motor of delicate form to adapt it to the work of driving a phonograph and all complicated electric governing mechanisms are dispensed with. The speed of the power shaft 8 may be regulated by means of suitable governing mechanism 12. This mechanism, best shown in Figs. 2 and 5, may comprise the collar 13 pinned to the shaft 8 and the sleeve 14 sliding on said shaft and carrying a brake disk 15. Connecting the collar 13 and sleeve 14 are suitable springs 16 carrying the weights 17. It will be understood that as the speed of the shaft rises the weights 17 will be thrown outward by centrifugal force bending the springs and drawing sleeve 14 and brake disk 15 toward the left. Suitable brake means are provided to cooperate with the disk 15 and I have herein shown them as comprising the yoke 18 journaled as at 19 on an axis extending substantially parallel to the plane of the disk 15. Each arm of the yoke carries a suitable brake shoe 20 which may be retained in place as shown in Fig. 5 by bending over the ends of the arms of the yoke thereon as indicated at 21. By journaling the yoke at 19 as described it is adapted to adjust itself to the face of the disk 15 and an even and well distributed pressure is provided for. In the embodiment shown the pivot 19 is formed in an arm 22 depending from the rock-shaft 23 which has bearings at 24 in the hanger 9. The rock-shaft 23 may be actuated in any suitable manner as, for example, by means of the nut 25 traveling on screw 26 which may be turned from the exterior of the phonograph cabinet and the distance of the yoke 18 from the brake disk 15 thereby be adjusted. This enables one to impose a certain desired maximum speed on the power shaft 8.

The spindle 3 is driven from the power shaft 8 by suitable gearing herein exemplified by the worm 27 on the shaft 8 and the worm wheel 28 on the spindle 3 (see Figs. 2 and 4). The spindle 3 is preferably mounted in suitable bearings provided in a

bracket 29 pivoted at 30 on the hanger 9 so that the spindle 3 can be swung to and from the shaft 8 to bring the gearing into mesh or adjust the same. This mounting considerably simplifies the assembling of the machine as it enables one to compensate for slight inaccuracies in the assemblage of the parts, maintaining always a perfect correlation of the gearing 27 and 28.

I provide means for so driving the record support 1 that it may be given a forced movement independent of the speed of the motor or the value of the connecting train without imposing any strain on the various parts of the mechanism which might strip the gears, loosen the bearings or otherwise deleteriously affect the machine. Such a method of driving is advantageous because operators of phonographs seldom have much appreciation of the mechanism involved and will not infrequently stop the record holder by catching it with the hand without halting the motor or even turn it backward for several revolutions. The method furthermore provides means for taking up the inertia of the rotating table when the power is shut off. For this purpose I preferably provide a frictional driving means, an example of which is illustrated in Figs. 2 and 4, there being shown as embodying a frictional surface carried by the spindle 3. This surface may consist of a fiber washer 31 suitably mounted as by means of the collar 32 to which the washer 31 may be fastened, for example by means of a pin as shown and suitable adhesive. The base of the hub member or sleeve 2 is provided with a cooperating frictional surface here shown as a similar washer 33 adhesively secured to the bottom of the sleeve. When the record holder 1 is placed over the spindle 3 the weight of the same will be sufficient to press the frictional surfaces 31 and 33 into such contact that the rotation of the motor communicated through the belt 6 and shaft 8 will act to rotate the holder in the usual manner. If, however, any extraneous force is placed on the holder 1 in opposition to the motor the surfaces 31 and 33 will slip and no strain will be imposed on the motor or on the train of mechanism by which the record support is driven. The construction also causes the speed of the holder to pick up or fall gradually.

Furthermore any burning out or injury to an electric motor is obviated by my invention since whether the turntable 1 is checked either by hand or by the usual brake or whether the shaft 8 is halted by the action of the governor or otherwise the connection at 31—33 or the connection by means of the belt 6 or both will function to permit idle movement of the rotor. Fluctuations of the current delivered to the motor such as are common in commercial lines in country districts will not adversely effect the operation of the machine.

In the foregoing description I have gone into considerable detail as to the particular mechanical parts which are utilized in the embodiment of my invention illustrated in the drawings. It will be understood, however, that the various mechanisms are merely examples of those which might be used to carry out the principles of my invention and that what I do claim and desire to secure by Letters Patent is:

1. In a sound reproducing machine, a case having an opening therethrough, motor mechanism in the case including a driving spindle projecting through said opening, a collar on said spindle, a turntable having a hub to receive said spindle of a size to pass through the opening and rest on the collar and cooperating frictional driving surfaces on the hub and collar.

2. In a phonograph, in combination, a bracket, bearings in said bracket, a spindle mounted in said bearings and arranged to drive the record holder, a driving shaft and cooperating gearing on said driving shaft and spindle, said bracket being mounted for swinging movement to move said spindle to and from said shaft whereby to adjust said gearing.

3. In a phonograph, in combination, a bracket, bearings in said bracket, a spindle mounted in said bearings and arranged to drive the record holder, a shaft gearing with said spindle and speed responsive means govern the shaft and through it the spindle, said bracket being mounted for swinging movement to and from said shaft whereby to adjust the gearing.

In testimony whereof I have signed my name to this specification.

OTTO B. COLE.

USED NEEDLE RECEIVER FOR TALKING MACHINES.

1,267,077 ----- A. A. Huseby,
Filed July 5, 1917,
Patented May 21, 1918.

A. A. HUSEBY.
 USED NEEDLE RECEIVER FOR TALKING MACHINES.
 APPLICATION FILED JULY 5, 1917.

1,267,077.

Patented May 21, 1918.

Fig. 1.

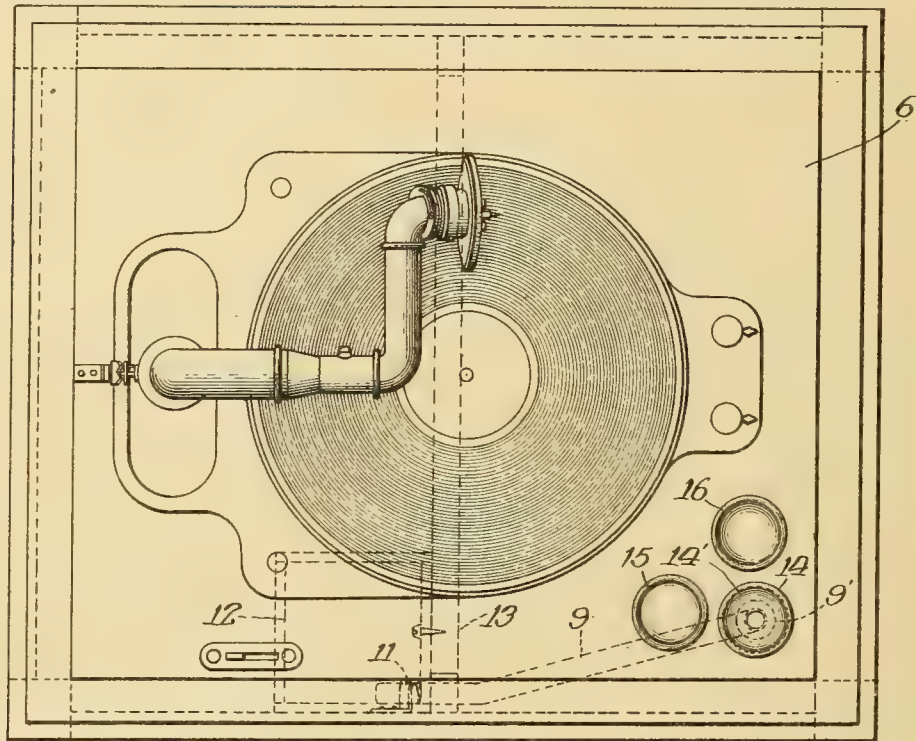
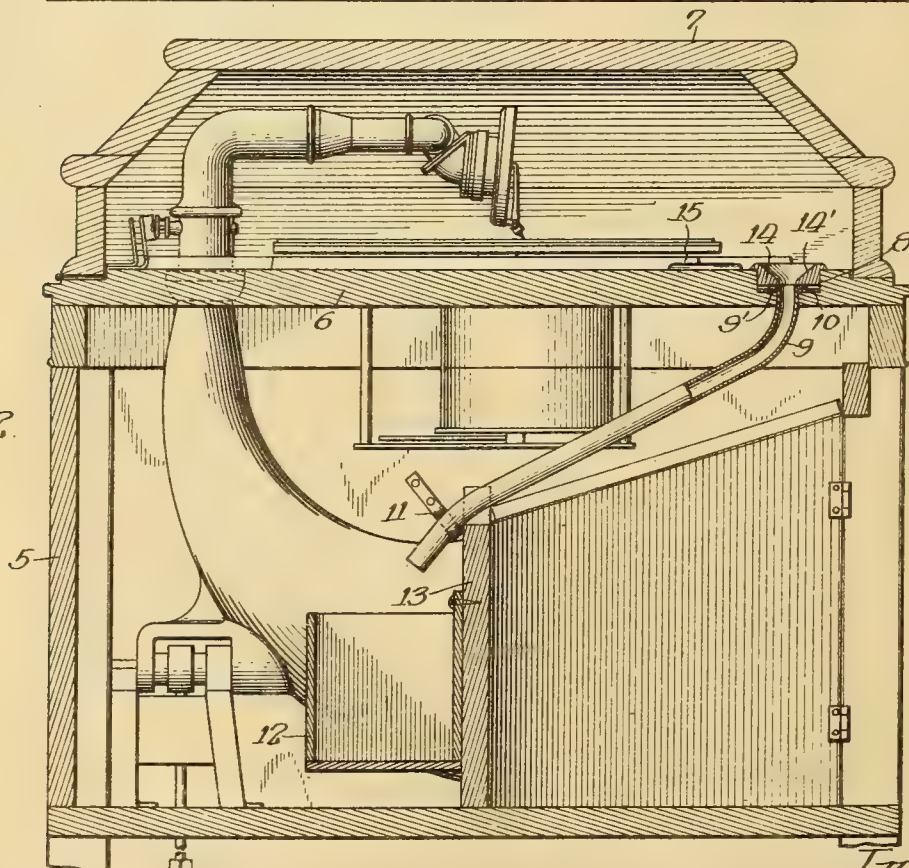


Fig. 2.



Witnesses:
 Geo. Hanson
 C. H. Rossoner.

Inventor:
 Albert A. Huseby
 By Pond & Wilson
 Attys.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

USED-NEEDLE RECEIVER FOR TALKING-MACHINES.

1,267,077.

Specification of Letters Patent. Patented May 21, 1918.

Application filed July 5, 1917. Serial No. 178,659.

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Used-Needle Receivers for Talking-Machines, of which the following is a specification.

This invention relates to receivers for the used needles of talking machines. In the manufacture of talking machines it is now the general practice to provide on or in the top wall of the cabinet, at one side of the turn-table or record support, one or more cups or pockets to contain new needles, and also a similar cup or pocket to hold the used or spent needles. Since a used needle is nowise different in appearance to the naked eye from a new needle, used needles are not infrequently picked up and used by mistake for new needles, especially by those unfamiliar with the machine. Moreover, these receptacles are of quite limited capacity, and require to be frequently emptied.

It is the purpose or object of the present invention to provide, in a cabinet talking machine, an improved receiver for the used or spent needles that shall obviate the objections above noted, and shall so dispose of the used needles that they will not only be out of sight, but will also be out of reach so that they cannot be re-used by mistake for new needles, and that will accomplish these desirable results with the expenditure of no more time, trouble, or effort on the part of the user than is now required to deposit them in the usual receiving cup or holder. To these ends my invention consists in the novel used needle receiver incorporated in a cabinet talking machine as hereinafter described and definitely pointed out in the claims.

My invention, its manner of use, and the advantages attending the same will all be readily understood by those familiar with talking machines from the subjoined description, taken in connection with the accompanying drawing forming a part of this specification, wherein—

Figure 1 is a top plan view, with the cover removed, of a cabinet talking machine in which my present invention is embodied;

Fig. 2 is a vertical section, substantially in the plane of the needle delivery chute.

Referring to the drawing, 5 designates the main body, 6 the horizontal top wall, and 7

the hinged lid or cover of a talking machine cabinet of a well known standard form. Since the present invention is not concerned with the sound reproducing mechanism contained within the cabinet, this mechanism need not be herein described.

In the upper side of the top wall 6 is formed a socket 8, through the bottom wall of which extends the upper end of a downwardly inclined metal tube 9. The bottom wall of the socket is preferably surfaced with a thin metal disk 10, and the tube is secured in place by an annular flange 9' on its upper end overlying the disk 10. The lower end of the tube 9 is supported by a metal clip 11 that may be secured to a side wall of the body 5, and this lower end of the tube directly overhangs the open upper end of a box 12, preferably of considerable size, that, in the present instance is secured to an interior transverse wall 13 of the body. Obviously this box may be otherwise secured, or may simply rest upon any suitable support within the cabinet, if preferred.

Fitted within the socket 8 is a funnel 14 consisting, in the present instance, of a wooden block or disk of considerable thickness having a flared hole 14' formed there-through, the lower end of said hole registering and communicating with the upper end of the tube 9.

From the foregoing it will readily be seen that the funnel 14 and tube 9 together constitute a chute into which used needles may be dropped and through which they will slide by gravity and fall into the box or receptacle 12 in which latter they may accumulate until the box is full.

It will readily be seen that by the use of the device hereinabove described and shown in the drawing the needles, as fast as they are used, are so disposed of that they are both out of sight and out of reach and cannot be re-used by mistake for new needles. The box 12 is preferably of such size as to require emptying only at very long intervals; and, where each needle is used but once, as is the most approved practice, the contents of the box 12 afford a ready means for ascertaining the extent to which the machine has been used, that is, the number of records it has played, up to the time of emptying the box 12. At 15 and 16 I have indicated a pair of cups forming receptacles for new needles (hard and soft) which, in practice, are also located on

or in the upper side of the top wall 6; but the presence or absence of these receptacles is, of course, immaterial to the present invention.

5 Manifestly the specific location and arrangement of the cooperating parts of my improved needle receiver may be modified to suit different constructions of cabinets without involving any departure from the
10 principle involved or sacrificing any of the advantages inherent therein.

I claim:

1. In a talking machine, the combination
15 with a cabinet having a top wall formed with a socket in its upper side, of a used needle receiver comprising a box located within the cabinet below said top wall, a tube at its upper end extending through and
20 secured in the bottom wall of said socket and at its lower end overhanging said box, and a removable funnel seated in said socket and registering at its lower end with the upper end of said tube.

2. In a talking machine, the combination
25 with a cabinet having a top wall formed with a socket in its upper side having an apertured bottom wall, of a depending de-

livery tube for used needles extending through the aperture of said bottom wall and formed at its upper end with an an-
30 nular supporting lip or flange, a box located within said cabinet beneath the lower or discharge end of said tube, and a removable block fitting and filling said socket and formed with a funnel-shaped passage regis-
35 tering with the upper end of said tube.

3. In a talking machine, the combination with a cabinet having a top wall formed with a socket in its upper side having a cen-
40 trally apertured bottom wall, of a lining disk for said bottom wall formed with an aperture registering with the aperture of the latter, a depending delivery tube for used needles extending through said aper-
45 tures and formed at its upper end with an annular supporting lip or flange overlying and resting on said lining disk, a box lo-
cated in said cabinet beneath the lower or
50 discharge end of said tube, and a removable block fitting and filling said socket and formed with a funnel-shaped passage registering with the upper end of said tube.

ALBERT A. HUSEBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

FILING DEVICE FOR TALKING MACHINE RECORDS.

1,267,366 ----- C. J. Boussfield,

Filed July 10, 1916,
Patented May 28, 1918.

C. J. BOUSFIELD.
 FILING DEVICE FOR TALKING MACHINE RECORDS.
 APPLICATION FILED JULY 10, 1916.

1,267,366.

Patented May 28, 1918.

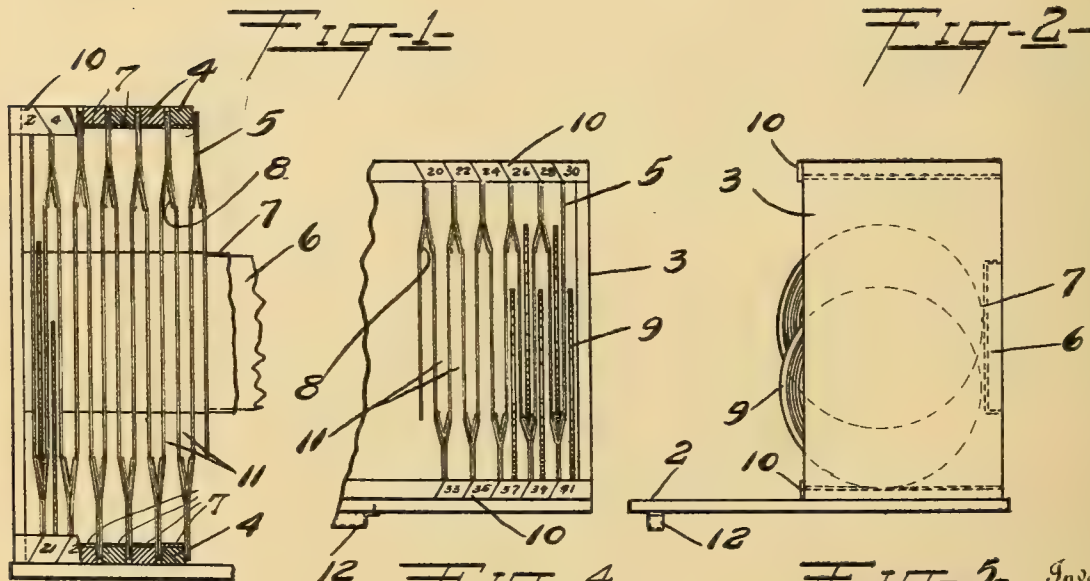
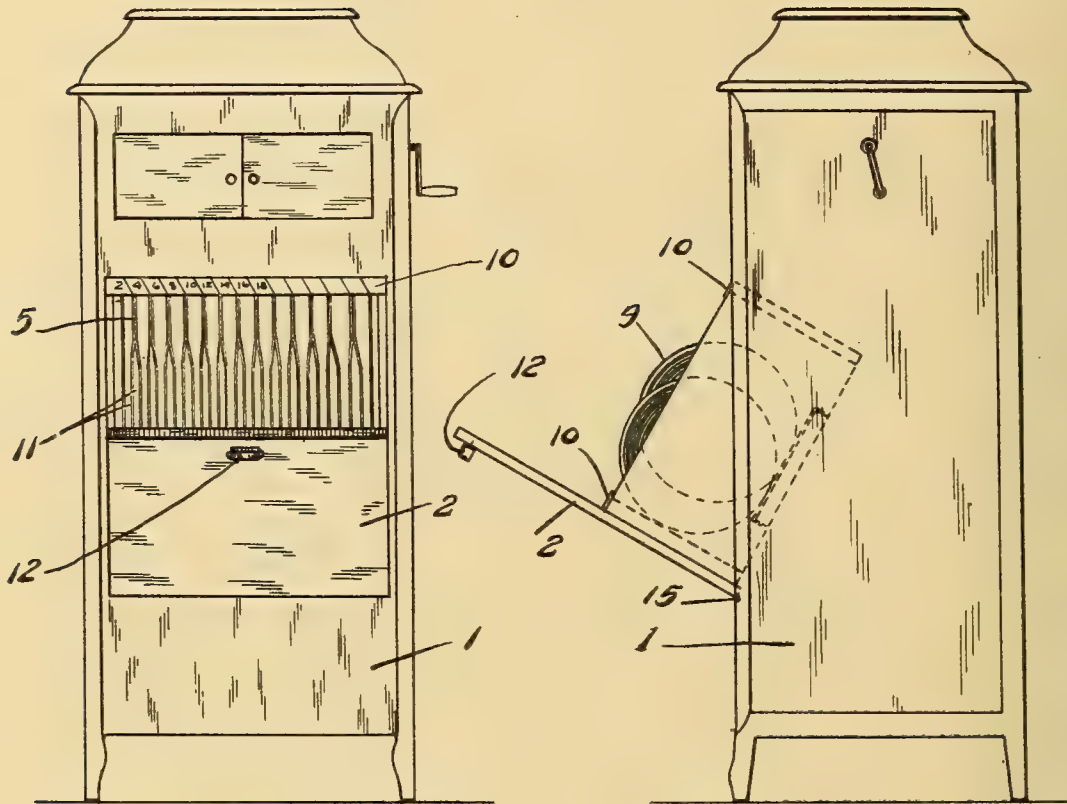


Fig-3

Fig-4

Fig-5 Inventor

Charlie J. Bousfield

Edward R. Monroe.
 Attorney

UNITED STATES PATENT OFFICE.

CHARLIE J. BOUSFIELD, OF BAY CITY, MICHIGAN, ASSIGNOR TO THE DELPHEON COMPANY, OF BAY CITY, MICHIGAN, A CORPORATION OF MICHIGAN.

FILING DEVICE FOR TALKING-MACHINE RECORDS.

1,267,366.

Specification of Letters Patent. Patented May 28, 1918.

Application filed July 10, 1916. Serial No. 108,497.

To all whom it may concern:

Be it known that I, CHARLIE J. BOUSFIELD, a citizen of the United States of America, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Filing Devices for Talking-Machine Records, of which the following is a specification.

This invention relates to filing devices for talking machine records.

One object of the invention is to produce a device which will hold the maximum number of records within a limited space, which will be properly indexed, and from which any particular record can be easily removed. Another object resides in the provision of flexible compartments which are alternately situated one above the other thus facilitating the easy removal of the records from the compartments.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportion and minor details without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Figure 1 is a front elevation of the device.

Fig. 2 is a side elevation thereof.

Fig. 3 is an enlarged section of the filing case.

Fig. 4 is a front elevation of the same.

Fig. 5 is a side elevation of the same.

In the drawings 1 is an ordinary cabinet of the type now in general use within which, at the top thereof, is housed the talking machine. At the lower part of the front of the cabinet, a door 2 is hinged in any suitable manner as shown at 15. The outward swing of the door 2 is limited by a stop (not shown) set within the cabinet proper.

To the inner side of the door 2 are secured the side members 3 of the filing device and these members extend within the cabinet 1. The members 3 are connected at the top and bottom by a plurality of small strips 4 of any suitable material covered with cloth or other fabric as shown at 7. These strips 4 may be secured together in any suitable manner.

Secured to the members 3 is a stop 6 extending across the back of the filing device and this stop is also covered with cloth or other fabric 7. 5 indicates the flexible partitions which are formed of tough paper or other suitable material. The ends of each partition are glued together alternately at the top and bottom thereof, thus forming a double thickness of material at the top and bottom of each partition and this double thickness is secured between the several strips 4, thereby forming a continuous set of record holding compartments 11 of zig zag formation. By forming the compartments in this manner, the same are situated alternately one above the other, that is, every second compartment is higher than the preceding compartment and thus every second record 9 sets one above the other. Where the alternate ends of the partitions 5 are glued together, a crease is formed and to prevent the partitions from wearing at this point, due to the removal and insertion of the records and also to keep the walls of the compartments extended, a canvas strip 8 is inserted and glued thereto.

Along the upper and lower strips 4 is secured the strip 10 on which is placed the index numbers whereby each and every record 9 can be identified by its own number. A handle 12 is located at the front of the door 2 to operate the same.

It will be noted that the door 2 completely fills the entire space or opening in the front of the cabinet when the same is closed and that the filing device located on the inside of the door 2 completely fills the entire space or opening in the front of the cabinet when the door 2 is opened, whereby the maker can eliminate the finishing on the inside of the cabinet as it is not exposed to view, thereby reducing the cost of manufacture.

By virtue of an index device formed as described above it will be readily appreciated that the records are easily handled and can be taken from the case with ease, inasmuch as every second record sets one above the other and the material forming the partitions being flexible, it allows the operator to bend these partitions either to one side or the other in selecting the record desired, giving plenty of space for the thumb and forefinger to grasp the record.

What I claim is:—

1. A filing device of the character speci-

fied, comprising a plurality of flexible partitions spaced apart, and having end portions of alternate opposite adjacent partitions brought together and secured to form compartments having the ends of alternate compartments in a different plane from the corresponding ends of the intermediate compartments.

2. A filing device of the character specified, comprising a plurality of vertically disposed compartments arranged side by side, with the lower ends of alternate compartments in a higher plane than the lower ends of the intermediate compartments, and the alternate compartments having their upper ends flared and the intermediate compartments having their lower ends flared.

3. A filing device of the character specified, comprising a plurality of flexible partitions spaced apart, and having end portions of alternate opposite adjacent partitions brought together and secured to form compartments having the ends of alternate compartments in a different plane from the corresponding ends of the intermediate compartments, and supporting and spacing strips disposed between the united end por-

tions of the partitions which are secured thereto.

4. In a device of the class described, a cabinet, a door pivoted to said cabinet, a record holder secured to said door and including spaced end members and a plurality of strips arranged side by side and constituting side members connected to said end members, a plurality of flexible partitions secured between the aforesaid strips and comprising a plurality of record compartments.

5. In a device of the class described, a cabinet, a door pivoted to said cabinet, a record holder secured to said door and including spaced end members and a plurality of strips arranged side by side and constituting side members connected to said end members, a plurality of flexible partitions secured between the aforesaid strips and comprising a plurality of record compartments, said compartments being constructed whereby the alternate ends of adjacent pockets are spaced from the said side walls of the holder.

In testimony whereof I affix my signature.
CHARLIE J. BOUSFIELD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

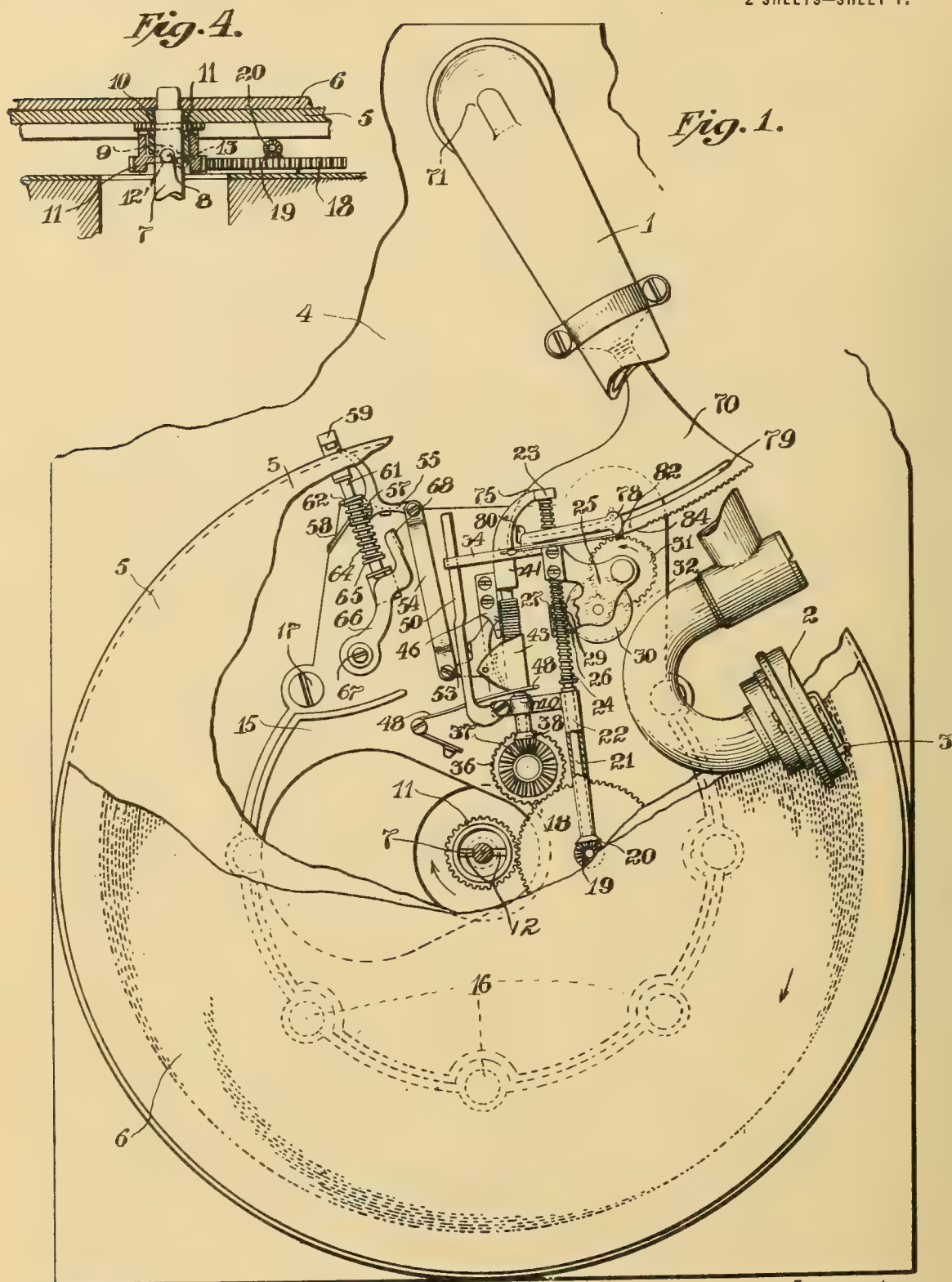
AUTOMATIC BRAKE MECHANISM.

1,267,378 ----- E. T. Condon, Jr.,
Filed Oct. 8, 1912,
Patented May 28, 1918.

E. T. CONDON, JR.
 AUTOMATIC BRAKE MECHANISM.
 APPLICATION FILED OCT. 8, 1912.

1,267,378.

Patented May 28, 1918.
 2 SHEETS—SHEET 1.



Attest:
W. B. Whitman
 May 28, 1918.

Edward T. Condon Jr. Inventor:
 by *W. B. Whitman* Atty

E. T. CONDON, JR.
 AUTOMATIC BRAKE MECHANISM.
 APPLICATION FILED OCT. 8, 1912.

1,267,378.

Patented May 28, 1918.

2 SHEETS—SHEET 2.

Fig. 2.

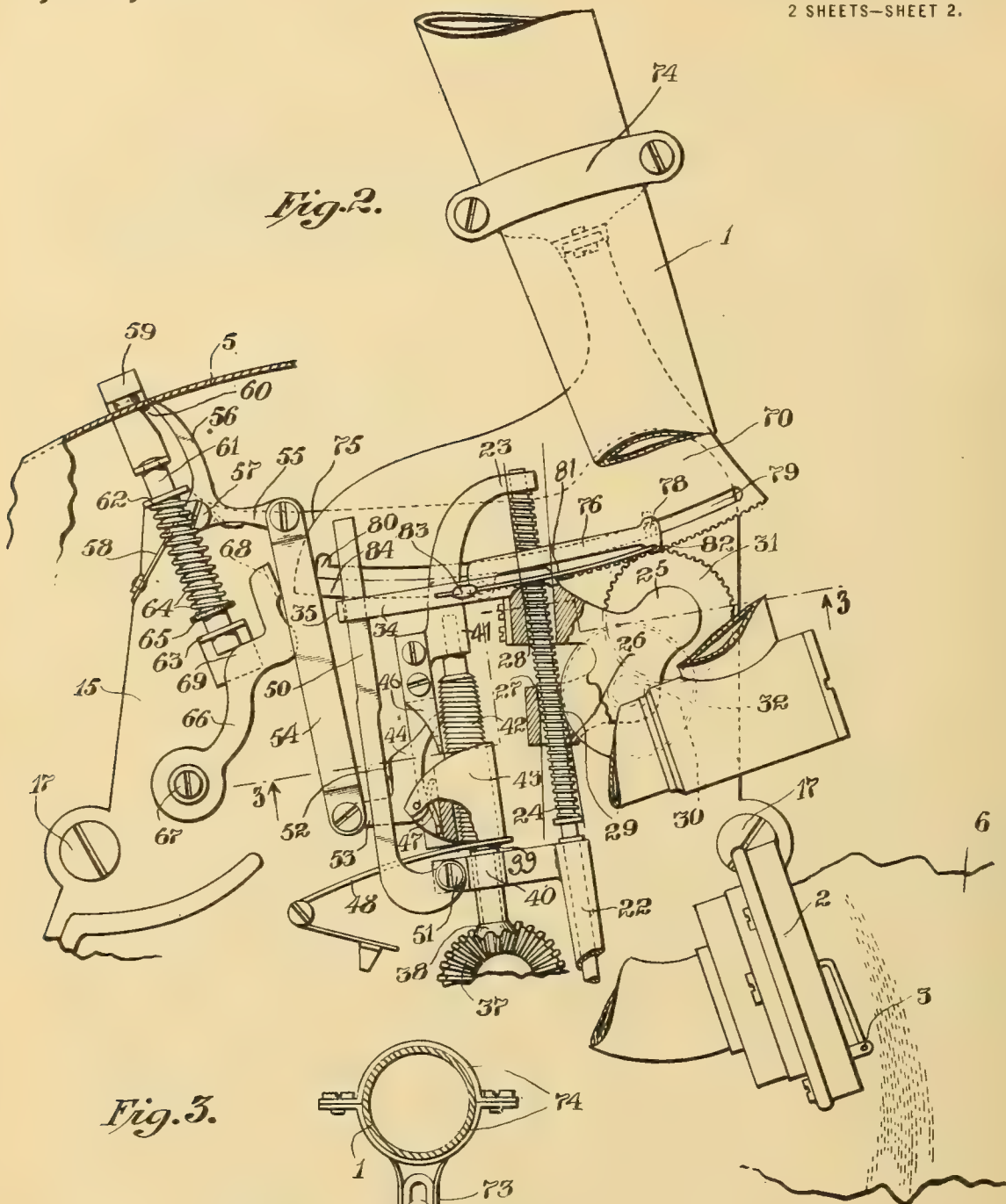
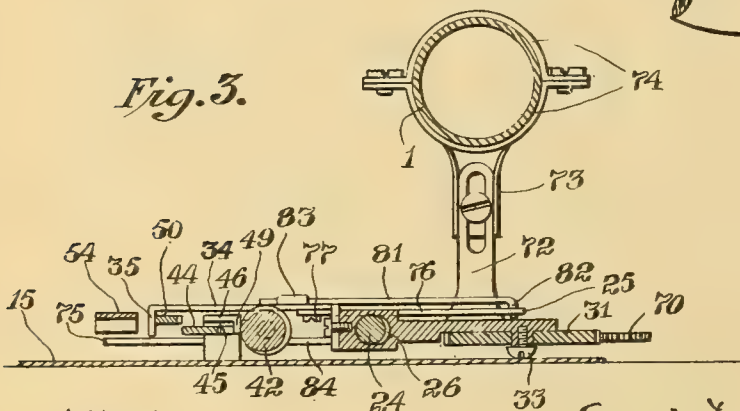


Fig. 3.



Attest:

E. T. Condon Jr.
 May Frevert.

Edward J. Condon Jr. Inventor:

by *W. B. Whitney*

Atty

UNITED STATES PATENT OFFICE.

EDWARD T. CONDON, JR., OF NEW YORK, N. Y., ASSIGNOR TO CONDON-AUTOSTOP COMPANY, A CORPORATION OF NEW YORK.

AUTOMATIC BRAKE MECHANISM.

1,267,378.

Specification of Letters Patent.

Patented May 28, 1918.

Application filed October 8, 1912. Serial No. 724,500.

To all whom it may concern:

Be it known that I, EDWARD T. CONDON, Jr., a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatic Brake Mechanism, of which the following is a specification.

My present invention relates to automatic brake mechanism for talking machines, particularly for that type of talking machine in which a disk record is employed, and to certain novel combinations of elements used therein which are well adapted for use in other and different connections.

The principal object of the invention is to provide a brake mechanism which, while inexpensive, readily attachable, and not liable to get out of order, may be used on talking machines without adjustment or regulation in connection with any standard disk record, notwithstanding the variations in the pitch of its sound-groove, and which will automatically stop the machine at the end of the selection no matter how long or how short that selection may be.

A further object of the invention is to provide a brake mechanism in which the brake may be released and reset, to start the machine, by a simple manipulation of the sound-arm.

A still further object is to provide an automatic brake mechanism which may be attached to any of the present standard talking machines without cutting away any part of or making any additional holes in the cabinet.

For the accomplishments of these objects the invention comprises certain novel features of construction, arrangement, and combination of parts, hereinafter fully described and more particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification and wherein there is illustrated one specific embodiment of my invention as adapted for and attached to a standard talking machine, Figure 1 is a plan view, with parts broken away, of a talking machine showing my improved brake mechanism in its normal or inoperative position; Fig. 2, a plan view, on a larger scale and partly in section, of the same brake mechanism in operative position

and of such broken parts of the machine as are necessary for the understanding of its operation; Fig. 3, a section on the irregular line 3 3 of Fig. 2; and Fig. 4, a detail showing, in elevation and partly in section, the means here employed for operatively connecting the brake mechanism with the vertical shaft or spindle of the motor.

The same reference numerals are used to indicate like parts throughout the several figures of the drawings.

Referring to the drawings, the usual sound-arm 1, carrying at its outer end the sound-box 2 and needle 3, is pivotally mounted on the top of the cabinet 4. The turn-table 5, carrying a record 6, is supported upon the projecting upper end of the motor-spindle 7 by the transverse pin 8, which is set in the spindle and normally bears against the bottom of a semi-circular notch 9 in the lower end of the collar 10 fixed to the lower side of the turn-table.

As here shown, the brake mechanism comprises a gear which is slipped upon the motor-spindle below the turn-table, a base-plate which is attached to the top of the cabinet and upon which is mounted the brake proper and most of the actuating mechanism therefor, and a sector-gear which is attached to and moves with the sound-arm.

The gear 11, with central opening fitting the motor-spindle, is provided with slots 12 the inclined sides 13 of which grip the pin 8 only at their upper edges, thus providing support for the gear upon the pin while allowing nearly half of the pin to project upwardly through the slots (see Fig. 4). This gear is put in place by removing the turn-table and slipping the gear upon the spindle, the turn-table being then replaced.

The base-plate 15 is provided with a number of screw holes 16 positioned to register with the holes of the screws 17 by which the motor is secured to the cabinet in the different makes of standard machines, and may therefore be attached to any of these machines by simply removing two or more of these screws, positioning the plate upon the top of the cabinet, and then replacing the screws. Mounted upon this base-plate is a gear 18 which meshes with the gear 11 and carries a bevel pinion 19 which in turn meshes with a bevel pinion 20 fixed to the

end of the shaft 21. The shaft is journaled in bearings 22—23 secured to the base-plate and between these bearings is provided with a worm 24. Slidably mounted upon this worm is a block 25 the bearings of which are slightly enlarged at 26 on one side and at 27 and 28 on the other side of the worm, thus allowing the block to swing horizontally upon the worm, around the point 29 as a center, from the position in which it is shown in Fig. 1 to that shown in Fig. 2. Pivotally mounted upon the lower side of the block are two gears 30 and 31, the gear 30 meshing with the worm at the point 29 and the gear 31 meshing with a pinion 32 fixed to the lower side of the gear 30, while the rounded end of the screw 33 (see Fig. 3) by which gear 31 is secured upon its pivotal bearing rests upon the base-plate and supports the block in horizontal position. The block also carries, rigidly secured to its outer end and extending at right angles to the axis of its bearing upon the worm, an arm 34 terminating in the downturned finger 35. A second gear 36 mounted upon the base-plate to mesh with the gear 18 carries a bevel pinion 37 meshing with a bevel pinion 38 fixed to the end of the shaft 39, the said shaft being supported in bearings 40 41 secured in the base-plate and provided with a ratchet-worm 42. A block 43 is mounted to slide upon this worm and carries pivotally mounted within its recessed edge a pawl 44, which is adapted to swing through a slot 45 under the fixed finger-piece 46 into engagement with the worm but is normally held out of such engagement by the spring 47. When in mesh with the worm the pawl, together with the block, is moved forward by the worm against the action of the spring 48 until disengaged by the wedge action of a shoulder 49 on the finger-piece 46 which forms the forward end of the slot 45, whereupon the parts are moved back to normal position by the spring 48. A lever-arm 50, which is pivoted to the base-plate at 51, bears against the finger 52 projecting upwardly from the back of the pawl and in turn is engaged by the downturned finger 35 of the arm 34. The arm 53 of the pawl is pivotally connected by the link 54 to the arm 55 of a trigger or detent 56, which is pivoted at 57 to the base-plate and is normally held in active position by the spring 58. The brake 59, which is adapted to bear against the downturned peripheral rim of the turn-table, is attached to the end of a bar 61 mounted to slide in brackets 62 63 secured to the base-plate and is normally held in its "on" position by the spring 64 which is coiled around the bar and bears at one end against the bracket 62 and at the other end against a collar 65 on the bar. It is held in "off" position, against the action of the coiled spring, by the engagement of

the trigger with the notch 60 formed in its side. A lever 66, which is pivoted at 67 to the base-plate and which at its other end has a downwardly projecting finger 68, is provided intermediate its ends with the cam-surface 69 which is adapted to bear against the inner end of the brake-bar to force the brake outwardly to its "off" position.

The sector-gear 70, centered at 71 (Fig. 1) slightly to one side of the pivotal center of the sound-arm, is mounted upon to swing with the sound-arm by means of the upright arm 72 which is adjustably secured to the vertically depending arm 73 attached to the sound-arm by the strap 74; and its edge 75 is adapted to engage the downturned finger and actuate the pivoted cam-lever 66, when the sound-arm is swung inwardly toward the center of the record. It is connected with the sliding block 25, hereinabove described, by means of the lever-arm 76 which is pivoted at 77 (Fig. 3) to the projecting arm 34 of the block and is provided at its other end with a headed pin 78 which works in the curved slot 79 extending parallel to the periphery of the sector-gear, the end of the slot being enlarged at 80 to admit the head of the pin. The spring 81, which at the end 82 is pivoted in the outer end of the lever-arm 76 and at its other end is held in the lug 83 on the back of the arm 34 fixedly in line with that arm, tends normally to draw the arm 34 back until the pivoted lever-arm 76 extends parallel thereto and thus to hold the block 25 in the position shown in Fig. 1, with the gear 31 yieldingly pressed against the sector-gear with which it is adapted to mesh. A portion 84 of the periphery of the sector-gear is preferably not toothed, so that when the machine is started with the needle in the outer end of the sound-groove of the record the gear 31 will for a time bear against this plane portion of the sector-gear. The toothed portion is, however, extended inwardly so that its teeth will reach and mesh with the gear 31 before the needle reaches the end of even the shortest sound-groove.

The brake mechanism is so designed as to operate normally in connection with a record having a sound-groove of the highest standard pitch, for example, one hundred and twenty turns to the inch, and can then, because adapted to compensate for normal variations in the speed of the movement of the sound-arm due to variations in the pitch of the sound-groove, be used without adjustment or change of any kind in connection with records having sound-grooves of lower or partly lower pitch. Accordingly, the gears connecting the gear 31 with the motor-spindle are so proportioned that, when the needle is moved inwardly across the record for one inch by one hundred and twenty revolutions of the spindle and turn-

table, the gear 31 actuated by the spindle through its train of gears and the sector-gear actuated by the inwardly swinging sound-arm will move together at substantially the same speed.

The operation of the device is as follows: The machine is started with a record of the highest pitch, say, a pitch of one hundred and twenty, upon the turn-table. The parts of the machine and the brake mechanism are then in the position illustrated in Fig. 1, with the gear 31 bearing against the plane surface of the sector-gear 70, and the gear and sector-gear, both actuated by the motor the former through its train of gears and the latter through the movement of the sound-arm as the needle is carried inwardly in the spiral sound-groove of the revolving record, begin to move, the gear 31 preferably with a speed slightly less than the speed of the sector-gear. After the record has made a number of revolutions the sound-arm will have been moved around until the toothed portion of the sector-gear reaches the gear 31 and the teeth of one will then either mesh with or bear against the ends of those of the other, but in neither event will the needle exert any undue pressure against the sides of the sound-groove as the sector-gear will move slightly faster than the gear 31. On reaching the end of the sound-groove the needle remains stationary, and the further movement of the sound-arm and consequently of the sector-gear is thereupon arrested. Then, as the worm continues to revolve while the sector-gear remains stationary, the gear 31 turning if not already in mesh until it can be brought by the spring 81 into mesh with the sector-gear and beginning to bind, will run backward along the sector-gear and at the same time lock or partially lock the gear 30 against rotation, with the result that the block 25 will both be driven outwardly upon the worm and swung around upon the point 29 as a pivot to the position shown in Fig. 2, thereby causing the finger of its projecting arm 34 to trip the pivoted lever-arm 50 and force the pawl 44 into engagement with the ratchet-worm 42. Thereupon, this latter worm revolving at relatively high speed will move forward the pawl and sliding block 43, almost instantly withdrawing the trigger 56 from the notch 60 and thus releasing and setting the brake, until the pawl strikes the shoulder 49 and is thereby thrown out of mesh with the worm, whereupon the parts will be restored to normal position by the springs 48 and 58. To release the brake and start the machine again, the needle is simply raised from the record and the sound-arm swung over until the edge 75 of the sector-gear, engaging the downturned finger of the pivoted arm 66, forces that lever back and the brake out

until the trigger springs back into the notch therein. The fact that the sector-gear is mounted slightly off center, thus causing it to act as a cam with gradually decreasing radii as the sound-arm moves inwardly toward the center of the record, and producing a slight slipping motion, provides the necessary compensation in case a record of lower pitch is used upon the machine and obviates friction. In such case where a record, for example, has a pitch of seventy turns to the inch, which is practically the minimum, the sector-gear will of course move somewhat more rapidly than when a record of higher pitch is used and therefore more rapidly than the gear 31, and will slip thereon until its teeth can come into mesh with those of the gear 31 and thereafter its higher rate of speed will be substantially taken up by the gradually decreasing radii on which it acts.

While I have explained the principle of my invention in what I now consider the best mode in which to apply that principle, it will of course be understood that the specific embodiment of the invention shown and described can be greatly modified in its various details, within the scope of the appended claims, without departing from the spirit or sacrificing the advantages thereof.

What I claim as new, and desire to secure by Letters Patent, is—

1. In brake mechanism, the combination with two moving members of a brake member for one of said moving members and means adapted to remain inoperative during variations in the speed of the second of said movable members above a certain predetermined minimum and to be rendered operative by a reduction of its speed below such minimum to render said brake member operative to stop the first of said moving members.

2. In brake mechanism, the combination with two moving members adapted to travel one at substantially constant and the other at varying speeds of a brake member for said constant speed moving member and means adapted to compensate for normal variations in the movement of said varying speed movable member and rendered operative by the stopping thereof to render said brake member operative.

3. In brake mechanism, the combination with two movable members and a motor adapted to drive them, one at substantially constant and the other at varying speeds, of brake means for said constant speed movable member which are adapted to remain inoperative while permitting said varying speed movable member to move at varying speeds and are rendered operative by the stopping thereof.

4. In brake mechanism, the combination of a rotating member, a traveling member,

a motor adapted to drive the rotating and traveling members, the traveling member at varying speeds, and brake means for the rotating member rendered operative by the
 5 stopping of the traveling member and adapted without regulation to the varying speeds thereof.

5. In brake mechanism, the combination of a rotating member, a traveling member
 10 adapted to move at varying speeds, a brake for the rotating member, a trip device for the brake, and means adapted without regulation to the varying speeds of the traveling member and rendered operative by the
 15 stopping thereof to actuate the trip device.

6. In brake mechanism, the combination of a rotating member, a traveling member adapted to move at varying speeds, a brake for said rotating member, a trip for said
 20 brake, and means adapted to compensate for normal variations in the speed of the traveling member and rendered operative by the stopping thereof to actuate the trip.

7. In brake mechanism, the combination
 25 with two moving members of a brake for one of said members and means located immediately beneath such member and rendered operative by the stopping of the other member to render the brake operative.

30 8. In brake mechanism, the combination with a rotating member and a traveling member of a brake for the rotating member tending normally to make frictional engagement therewith, means for holding the
 35 brake out of such engagement, and means located immediately below the rotating member and rendered operative by the stopping of the traveling member for releasing the brake to allow it to engage the rotating
 40 member.

9. In brake mechanism, the combination with a rotating member and a traveling member of brake means for the rotating member comprising a brake, an arm adapted
 45 to be attached to the traveling member, and connecting means located immediately below the rotating member and rendered operative by the stopping of the traveling member to render the brake operative.

50 10. In brake mechanism, the combination of a rotating member, a traveling member, a brake adapted normally to engage the rotating member, means for holding the brake out of such engagement, and means rendered
 55 operative by the stopping of the traveling member for releasing the brake to allow it to engage the rotating member.

11. In brake mechanism, the combination of a rotating member, a traveling member,
 60 a motor, a brake adapted to act upon the rotating member, means tending normally to move the brake into contact with the rotating member, means for holding the brake in inoperative position out of contact with
 65 the rotating member, and means actuated by

the motor and rendered operative by the stopping of the traveling member to release said brake-holding means.

12. In brake mechanism, the combination of a rotating member, a traveling member,
 70 a motor adapted to drive said members, a brake for the rotating member, means for holding the brake in inoperative position, means actuated by the motor for releasing the brake from its inoperative position,
 75 means actuated by the motor and rendered operative by the stopping of the forward movement of the traveling member to bring into operation the brake-releasing means, and means actuated by a further forward
 80 movement of the traveling member to restore the brake to its inoperative position.

13. In brake mechanism, the combination of a rotating member, a traveling member,
 85 and brake means for the rotating member rendered operative by the stopping of the forward movement of the traveling member and rendered inoperative by a further forward movement of the traveling member.

14. In brake mechanism, the combination
 90 of a brake and brake-actuating means which include as elements thereof a worm, means for driving the worm, a block mounted to slide and also to swing laterally at one end upon the worm and operatively connected with the brake, a gear mounted upon
 95 the block to mesh with the worm at the point around which the block turns when swinging laterally thereon, a second gear mounted upon the block near its outer swinging
 100 end in mesh with the first gear, and an element adapted in coöperation with the second gear to cause the block to be moved outwardly and to swing laterally upon the
 105 worm.

15. A brake mechanism which includes as elements thereof a brake, a worm, means for driving the worm, a block mounted to slide upon the worm and provided with bearings allowing its outer end a limited lateral
 110 movement thereon, a trip-arm secured to the outer end of the block in operative relationship with the brake, a train of gears mounted upon the block to mesh with the worm at the axis of the lateral movement of the
 115 block, and a toothed element adapted to move in mesh with one of the gears of the train of gears and on the stopping of its movement to cause the block to be moved to actuate the trip.
 120

16. A brake mechanism which includes as elements thereof a worm, means for driving the worm, a block mounted to slide upon the worm and provided with bearings allowing its outer end a limited lateral movement
 125 around its inner end as a center, a trip-arm secured to the outer end of the block on one side of the worm, two gears mounted in train upon the block on the opposite side of the worm one of which gears meshes with
 130

the worm at the inner end of the block and the other of which gears projects outwardly beyond the outer end of the block, a sector-gear mounted adjacent the outer end of the
 5 block and adapted to mesh with the outer of the two gears thereon, means independent of the worm for driving the sector-gear at substantially the same speed as that at which the outer gear is driven by the worm,
 10 and means tending normally to slide the block outwardly and swing its outer end laterally to throw the outer gear toward the worm and press it outwardly into engagement with the sector-gear.

17. A brake mechanism which includes as elements thereof a traveling member, a motor adapted to drive the traveling member, a worm driven from the motor, a block mounted to slide upon the worm and having
 20 bearings allowing its outer end a limited lateral movement around its inner end as a center, a trip-arm secured to the outer end of the block on one side of the worm, gears mounted in train upon the block on the
 25 other side of the worm the inner gear meshing with the worm at the inner end of the block and the outer gear extending outwardly beyond the outer end of the block, a sector-gear mounted upon the traveling
 30 member adjacent the outer end of the block and adapted to mesh with the outer gear thereon, and means tending normally to slide the block outwardly and move its outer end laterally to hold the outer gear close to
 35 the worm and to press it outwardly against the sector-gear.

18. A brake mechanism which includes as elements thereof a traveling member, a motor adapted to drive the traveling member,
 40 a worm driven from the motor, a block mounted to slide upon the worm and having bearings allowing its outer end a limited lateral movement around its inner end as a center, a trip-arm secured to the outer end
 45 of the block on one side of the worm, gears mounted in train upon the block on the other side of the worm the inner gear meshing with the worm at the inner end of the block and the outer gear extending out-
 50 wardly beyond the outer end of the block, a sector-gear mounted upon the traveling member adjacent the outer end of the block and its outer gear and slightly eccentric so as to present a gradually retreating periph-
 55 ery as the traveling member moves forward, a lever pivoted at one end to the trip-arm on the block and bearing at its other end in a grooved slot in the sector-gear, and means tending normally to draw the outer end of
 60 the block outwardly toward the said lever and to hold the outer gear upon the block in engagement with the sector-gear.

19. In brake mechanism, the combination of a moving member, a brake therefor, a
 65 second moving member, and brake-actuat-

ing means controlled by the movement of the second moving member and including a member so mounted to move therewith as to present a gradually retreating operative
 70 surface as it is moved forward.

20. In brake mechanism, the combination of a moving member, a brake therefor, a pivotally mounted member, a sector-gear so mounted to move with said pivotally mount-
 75 ed member as to present a gradually retreating periphery as it is swung forwardly therewith, and suitable operative connections between the sector-gear and the brake.

21. In brake mechanism, the combination of a rotating member, a brake therefor, a
 80 pivotally mounted arm, and means, including as an element thereof a sector-gear mounted to move directly with the arm about an axis slightly eccentric to the axis
 85 of the arm, operatively connecting the said arm with the brake.

22. In brake mechanism, the combination of a brake, a trip for the brake, and means for actuating the trip which include a
 90 ratchet-worm, means for driving the ratchet-worm, a pawl slidably mounted upon the ratchet-worm and normally held out of engagement therewith, means for
 95 throwing the pawl into engagement with the ratchet-worm, means for disengaging the pawl from the ratchet-worm after it has been carried thereby a predetermined distance, and means for restoring the pawl to
 100 its original position with respect to the ratchet-worm.

23. In brake mechanism, the combination of two moving members, a brake for stop-
 105 ping one of said members, and means located beneath such member and rendered operative by the stopping of the other mem-
 110 ber for rendering said brake operative.

24. In brake mechanism, the combination of a rotating member, a traveling mem-
 115 ber, a brake for stopping said rotating member, means for holding the brake out of operation, and means located beneath the rotating member and rendered operative by the stopping of the traveling member for
 120 releasing said brake.

25. In brake mechanism, the combination
 125 of a rotating member, a traveling member, a brake for preventing rotation of said rotating member, means for holding the brake out of operation, and means rendered opera-
 130 tive by the stopping of the traveling member for releasing the brake to stop the rotat-
 135 ing member.

26. In brake mechanism, the combination of a rotating member, a traveling member,
 140 a motor, a brake for preventing rotation of said rotating member, means tending nor-
 145 mally to move the brake into braking position, means for holding the brake out of braking position, and means actuated by the motor and rendered operative by the
 150

stopping of the traveling member for releasing said brake.

27. In brake mechanism, the combination of a traveling member, a motor, a brake for stopping said motor, means for holding the brake out of braking position, and brake-releasing mechanism comprising means moved by said traveling member and motor respectively and operative to release said brake upon the stopping of said traveling member.

28. In brake mechanism, the combination of a rotating member, a motor for rotating the same, a traveling member, an element moved thereby, a brake for stopping said motor, means for holding the brake out of braking position, and means operated by said motor and coacting with said element, said last-named means operating to release said brake upon the stopping of the traveling member.

29. In brake mechanism, the combination of a motor, a brake for stopping the same, a traveling member, an element moved thereby, means for holding said brake out of braking position, and means operated by said motor and coacting with said element, said last-named means reacting upon said element to release said brake upon the stopping of said traveling member.

30. In stop mechanism, the combination of a traveling member, a motor, means for

stopping said motor, means for holding said last-named means out of operative position, and means for releasing said stopping means comprising cooperating elements moved by said traveling member and motor respectively and operating said stop-holding means upon the cessation of movement of said traveling member.

31. In stop mechanism, the combination of a traveling member, a motor, means for stopping said motor, means for holding said last-named means out of operative position, and means for releasing said stopping means comprising cooperating gear elements rotated by said traveling member and motor respectively and reacting upon the stopping of one of said gear elements to trip said stop-holding means.

32. In stop mechanism, the combination of a traveling member, a motor, a brake for stopping said motor, means for holding said brake out of braking position, and brake-releasing mechanism comprising cooperating elements moved by said traveling member and motor respectively, one of said elements being supplementarily moved upon the stopping of the traveling member to release said brake.

EDWARD T. CONDON, JR.

Witnesses:

WM. B. WHITNEY,
MAY FREVERT.

SPRING MOTOR

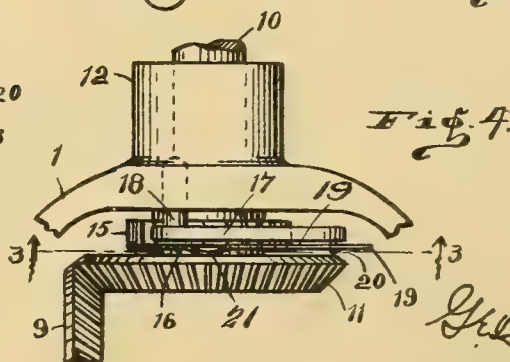
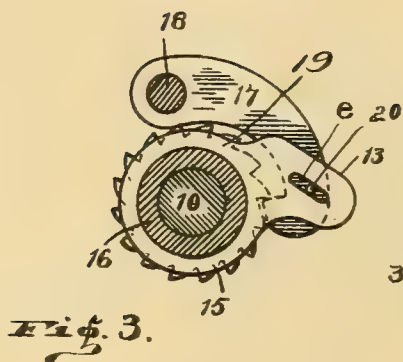
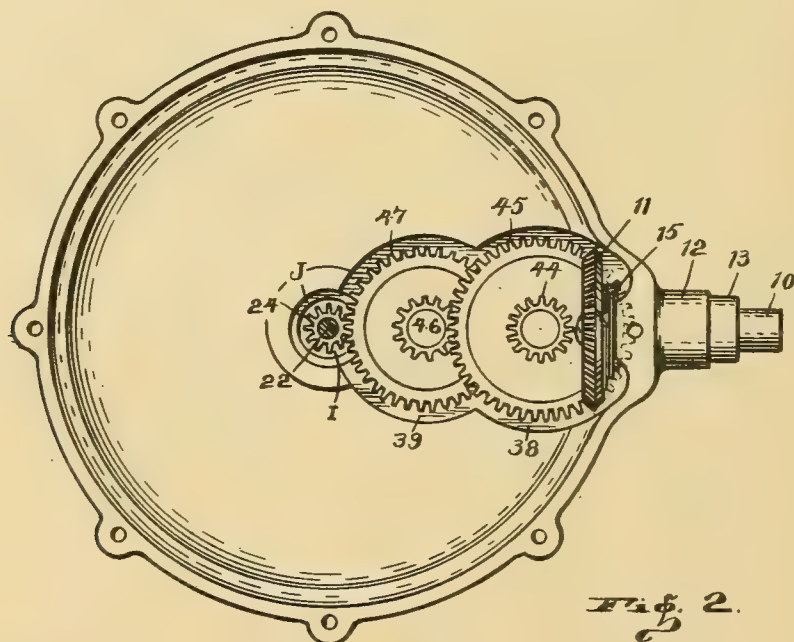
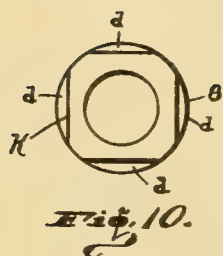
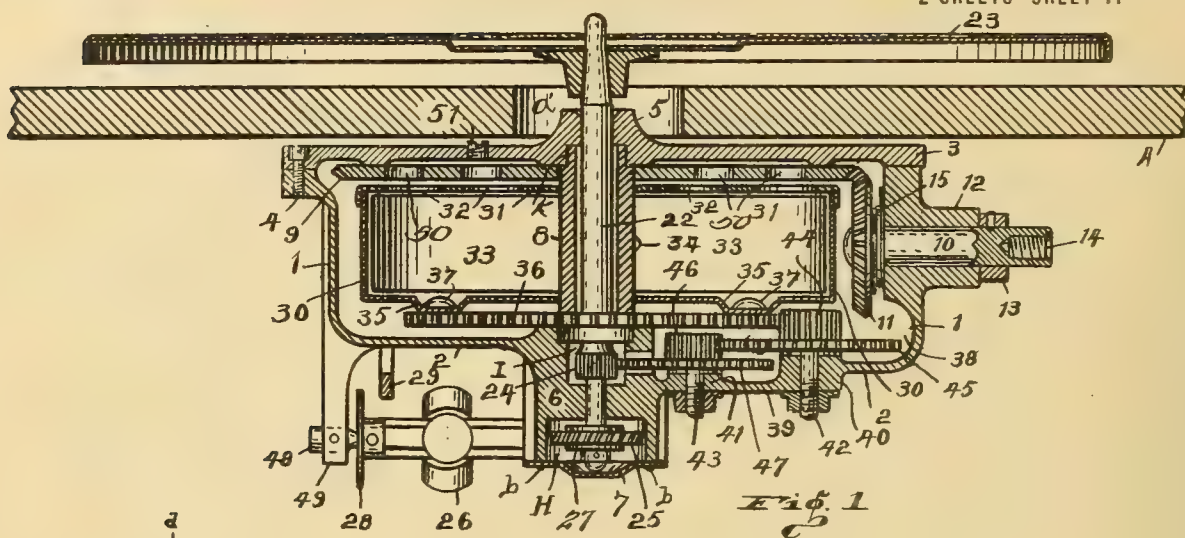
1,267,423 ----- G. R. Kunkle,
Filed June 29, 1917,
Patented May 28, 1918.

SPRING MOTOR.

Patented May 28, 1918.

1,267,423.

2 SHEETS—SHEET 1.



Inventor:

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Draftsman

1,267,423.

G. R. KUNKLE.
 SPRING MOTOR.
 APPLICATION FILED JUNE 29, 1917.

Patented May 28, 1918.
 2 SHEETS—SHEET 2.

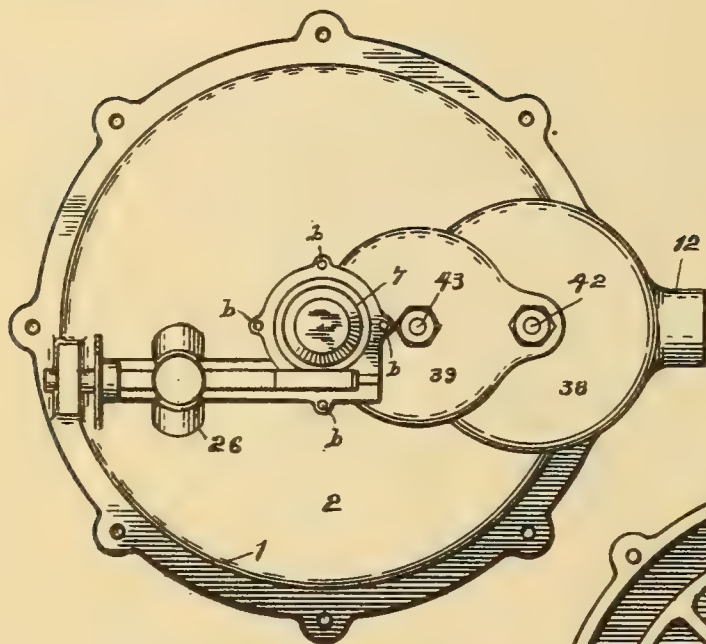


Fig. 5.

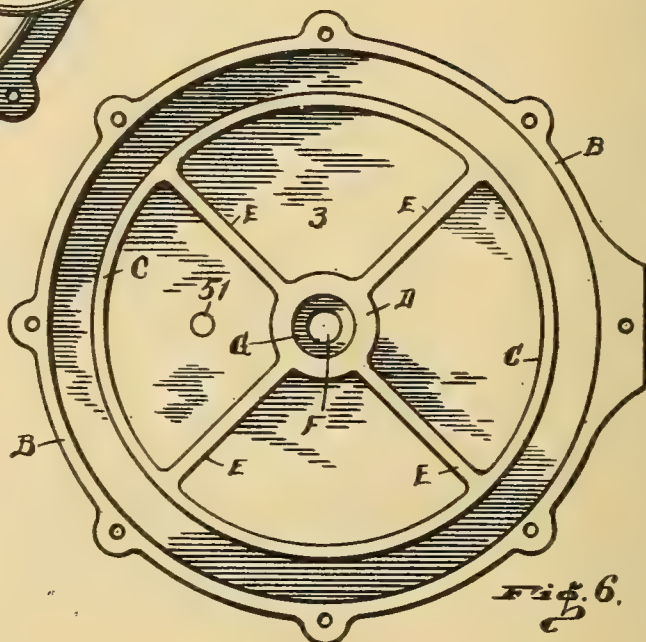


Fig. 6.

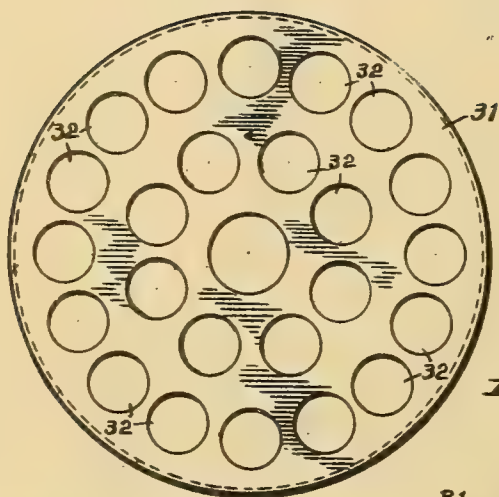


Fig. 7.

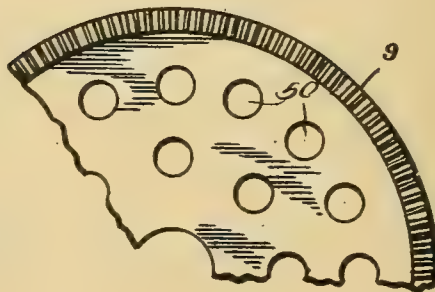


Fig. 9.



Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE R. KUNKLE, OF RICHMOND, INDIANA.

SPRING-MOTOR.

1,267,423.

Specification of Letters Patent.

Patented May 28, 1918.

Application filed June 29, 1917. Serial No. 177,799.

To all whom it may concern:

Be it known that I, GEORGE R. KUNKLE, a citizen of the United States, residing in the city of Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Spring-Motors, of which the following is a full, clear, and comprehensive specification, which, when taken in connection with the accompanying drawings, forms a complete delineation of the various features thereof, whereby a mechanic familiar with the art may formulate and construct an embodiment of the invention with exactitude.

Broadly stated my object is to produce a spring motor in which the mechanical construction is reduced to its most simple form, consistent with the highest degree of efficiency, whereby it will occupy but a minimum amount of space and at the same time will afford the maximum energy and will give the most satisfactory results in operation, and in which friction of the parts will be practically *nil*.

A further object is to provide a spring motor embodying the maximum of refinement throughout its arrangement and several parts, and by which an absolute smooth and noiseless operation is attained, which latter is the paramount desideratum in a construction of this character.

Other special advantages, and the particular points of refinement and arrangement will be brought out in the course of this description, and the preferred details of construction are clearly shown in the drawings forming a part of this specification.

The construction which I have found to give the best results in actual practice is shown in the accompanying two-sheets of drawings, in which—Figure 1 is a central vertical section as taken through the assembled motor. Fig. 2 is an inside inverted plan view with certain of the parts removed. Fig. 3 is a front elevation of certain parts of the ratchet-winding mechanism, as taken on the line 3—3 of Fig. 4. Fig. 4 is a detail elevation of the ratchet winding mechanism. Fig. 5 is a bottom plan view of the motor. Fig. 6 is an inside or bottom plan view of the cover or lid for the case. Fig. 7 is a top plan view of the spring barrel. Fig. 8 is a side elevation of the spring barrel. Fig. 9 is an inverted plan view of a fragment of the bevel gear wheel. And Fig. 10 is an upper end view of the hollow shaft.

Like reference characters denote similar parts throughout the several views of the drawings.

In order to enable any one to comprehend the embodiment of my invention and to more fully appreciate the various features thereof, I will now describe the several parts in concrete detail, and will explain certain of the advantages thereof in as comprehensive manner as possible.

In the drawings, it will be observed, I provide a case which includes the side wall 1 and the bottom 2, which parts are integral with each other. The case also includes the lid or cover 3, which is removably secured on the upper edge of the wall 1 by means of the four screws 4, which screws are inserted through adjoining pairs of ears extending out around the upper edge of the wall 1 and from the periphery of the cover 3. Also similar pairs of ears extend out from the wall and from the cover 3 through which may be disposed longer screws for securing the motor in suspended position where desired, and these latter screws also contribute to securing the cover to the body and making an oil-tight joint therebetween.

The cover 3 has a central upwardly projecting hub 5 which extends up into the aperture *a* of the relatively stationary table or base A, which may be a part of the cabinet which contains the motor. The under face of the cover 3 is formed with a peripheral face B; an intermediate face C, which is located inward from and concentric with the face B; and a central or hub-face D; and also a plurality of radial faces E connecting the faces C and D, all substantially as shown in Fig. 6. The spaces between said faces are adapted to contain grease or other lubricant, and they also add to the strength of the cover yet permitting it to be comparatively light in weight and to be formed with a minimum amount of material. All of the faces B, C, D and E are on the same plane, and the predominant purpose of said faces will hereinafter appear.

Letter F denotes the central aperture formed through the cover and concentric of the face D, and it also extends through the hub 5, its purpose being hereinafter explained. Also formed up into the center of the face D concentric of the aperture F is the bearing socket G, and its purpose will hereinafter appear. In the center of the bottom 2, and located directly opposite the hub 5, is the lower hub 6 which extends a

considerable distance below the bottom 2, and in the lower end thereof is formed a comparatively large chamber H, whose lower open end is adapted to be closed by the cap 7, which latter is removably secured in place by a plurality of screws 6.

Extending down into the upper portion of the hub 6 is the chamber I, which is concentric with but smaller than the chamber H.

10 Numeral 8 denotes the hollow shaft, whose upper portion is reduced in diameter, and the reduced portion thereof fits in the socket G, with the shoulder thereof in contact with the face D, and the lower end of said hollow shaft fits in the socket J (Fig. 2).
15 The socket J is of greater diameter than the chamber I, with which it is concentric, thereby forming a shoulder in the lower hub on which the lower end of the hollow shaft rests, as in Fig. 1.

Immediately below the reduced portion of the hollow shaft, that is: directly below the face D, the hollow shaft is formed square, as indicated at K in Fig. 9. Numeral 9 denotes the large bevel gear which has a central square aperture therethrough which fits over the square portion K of the hollow shaft, and it is retained by the shoulders d formed at the juncture of the squared portion K with the round portion of the shaft 8, in contact with the faces C, D and E, which prevents it from being forced out of alinement when force is applied to revolve it.

35 Numeral 10 denotes the winding shaft, which extends horizontally through the wall 1, and on its inner end is secured the small bevel gear 11 which meshes, at right angles, with the large bevel gear 9. A bearing 12 is formed integral with the wall 1 and it extends out around the shaft 10 to form a bearing support therefor. The collar 13 is secured to the shaft 10 and it bears against the outer end of the bearing 12 to prevent the shaft 10 from slipping inward beyond its adjusted position. A threaded socket 14 is formed in the outer end of the shaft 10 to receive a winding crank (not shown) for turning the shaft 10 in the usual manner.

50 Numeral 15 denotes a ratchet wheel which has a hub 16 surrounding the shaft 10 and it is secured to the wheel 15 said ratchet revolving at all times with the shaft 10 and the gear 11. Numeral 17 denotes a dog, which is mounted on the pintle 18, the latter being secured in the wall 1, as indicated in Fig. 4. The tooth of said dog is adapted to engage the teeth of the ratchet wheel, as shown in Fig. 3. Numeral 19 denotes a thin flat cam, formed of spring metal, and it fits rotatably around the hub 16 and has an extension at one side through which is formed the slot e. A pin 20 protrudes from the side of the dog, being located near the tooth thereof, and the said pin is disposed in the

slot e, as indicated in Fig. 3. A kink 21 is formed in the cam 19 whereby the said cam is retained in sliding frictional contact with the outer face of the gear 11. From the above it will be observed that when the shaft 10 is turned to the right, as in winding, that the cam 19 will be turned with the gear, thereby lifting the dog and by that preventing the dog from clicking over the ratchet wheel, yet as soon as the winding crank is released it is evident that the gear 11 starting to turn back will cause the cam 19 to press the dog down into engagement with the ratchet, thereby forming an absolutely silent wind.

80 Extending vertically through the hollow shaft 8, but without contact therewith, is the driven shaft 22, whose upper portion is fitted revolubly in an aperture in the hub 5, above which it extends; and its lower end is revolubly mounted in an aperture formed through that part of the lower hub located between the chambers I and H. Said shaft 22 also extends through the chamber H, and its lower rounded end rests upon the cap 7, as shown in Fig. 1. The said shaft 22 carries on its upper end portion the revolving disk or turn-table, which is removably attached thereto, and which forms the driven element. Secured to the shaft 22, immediately below the hollow shaft 8, is the pinion 24, the same being located in the said chamber I. Also secured to the shaft 22 is the worm pinion 25, the latter being located in the chamber H. The shaft of the governor 26 extends through the wall of the chamber H into and across said chamber, and it carries a worm 27 which meshes with the pinion 25, whereby the pinion 25 and the worm 27 revolve at right angles to each other. The governor 26 carries the sliding disk 28 which when the motor attains a predetermined speed contacts with the brake 29. I make no claim to the particular style of governor shown, but merely to the fact that the gears for its operation are located entirely in the inclosure, thereby protecting them from dust and other outside influences and also providing for their being automatically oiled, and also eliminating any possibility of noise emanating therefrom. The outer end of the governor shaft is carried by the pivot 48, and the latter is carried by the arm 49 which extends down from the bottom 2 of the case.

120 The spring barrel comprises the main cup portion 30 having a flat bottom and a circular vertical wall, and the top 31 which is flat with a down turned flange which fits over the upper edge of the cup 30, and a plurality of apertures 32 are formed through the top 31 for the passage of oil or grease, and if desired similar apertures may be formed through the bottom of the cup 30.

The spring barrel thus formed is mounted revolvably around the hollow shaft 8 which acts as its axis and with which it is concentric, but it is not attached thereto. A
 5 spring 33 is coiled around in the barrel, the outer end of which is secured to the vertical wall of the cup-portion 30, and its inner end is secured to the hollow shaft 8 by means of a hook 34.

10 Pressed down from the bottom of the spring barrel are a plurality of downwardly extending circular depressions 35, and contacting with the bases of said depressions is the large gear wheel 36, which
 15 is located around the hollow shaft and is concentric therewith, and is secured to each of said depressions by rivets, or the like 37. Said gear wheel 36 is slightly smaller in diameter than is the diameter of the
 20 spring barrel below which it is located.

Formed in the bottom 2 are two gear pockets, 38 and 39, which overlap each other, as shown in Fig. 5, but the latter is formed on a lower plane than is the former,
 25 each having a central hub as the hubs 40 and 41, respectively. Extending through said hubs are the respective axles 42 and 43, which are detachably secured in place. Numeral 44 denotes a pinion, and 45 denotes
 30 a gear wheel concentric and integral therewith, and they are centrally mounted on the axle 42, the pinion 44 meshing with the gear 36. Numeral 46 denotes a pinion, and 47 denotes a gear wheel which is concentric and
 35 integral therewith, and they are centrally mounted on the axle 43, the pinion 46 meshing with the gear 45, and the gear 47 meshing with the pinion 24.

The bevel gear wheel 9 is provided with
 40 a plurality of apertures 50 formed through its web, as shown in Fig. 10, whereby after removing the cover 3, or removing the oiling plug 51, lubricant may be placed on the gear 9 from which it will percolate through
 45 said apertures 50 to the mechanism therebelow.

Modus operandi: From the above it will be observed that the motor may be assembled as in Fig. 1, after which by turning the
 50 shaft 10 to the right the gear 11 will revolve the gear 9, and it in turn will rotate the spring arbor 8, and as the spring 33 is secured at its inner end to the hollow shaft it is evident that the spring will be wound
 55 tightly around the hollow shaft as the latter is carried around by the gear 9, and the ratchet will of course retain the spring in wound condition until it is otherwise released, as by the transmittal of power to the
 60 driven shaft.

Now as the outer end of the spring is secured to the spring barrel it will be seen that the expansive tendency of the spring will tend to revolve the spring barrel, which
 65 as it revolves will carry with it the gear 36.

The latter will exert its power upon the pinion 44, which latter will carry with it the gear 45. The gear 45 will transmit power to the pinion 46, which latter will carry with it the gear 47, and the latter meshing with
 70 the pinion 24, which is secured to the shaft 22, will of course cause the shaft 22 to be revolved at a comparatively high rate of speed with relation to the speed of the gear 36. The shaft 22 in turn will drive the gov-
 75 ernor through the medium of the worm-gear previously described, and also the shaft 22 will revolve the turn-table 23 at a constant rate of speed which is determined by the governor.

In practice all, or a part, of the movable parts may be provided with fiber bearings; also the interior of the case may contain the desired amount of oil or grease which will lubricate all of the bearings, and which can
 80 not escape from the case.

It should be observed that the shaft 10, the axles 42 and 43, are in direct alinement with each other. Also the governor mechanism is parallel with the first mentioned parts but
 90 located to the side of the center and on the side opposite to that of the first mentioned parts.

By the above it will be seen that the parts are arranged with a maximum of compactness, yet providing a very powerful and long running motor. Also practically all of the working parts, except a part of the governor, are tightly inclosed, which contributes to silent operation. Also it is evident that
 100 the oil and grease will tend to deaden any noise which might emanate from the metal parts. Therefore when constructed and arranged as herein set forth I find that there is no appreciable noise or jar emanating
 105 from the motor either in winding or in its operation.

I desire that it be understood that various changes may be made in the several details of construction and arrangement, from that
 110 herein shown, without departing from the spirit of my invention and without sacrificing any of the advantages thereof.

Having now fully shown and described my invention, what I claim, and desire to
 115 secure by Letters Patent of the United States, is—

1. A spring motor including an inclosing case adapted to contain lubricant, a vertical hollow shaft adapted to revolve in one di-
 120 rection only, a spring barrel comprising a cup-like body and a top covering the body and mounted to revolve around on said hollow shaft, a spring coiled in the barrel with its inner end attached to the hollow shaft
 125 and its outer end attached to the barrel, a gear wheel located below and secured to said barrel, a driven shaft mounted in the casing concentric of the hollow shaft, and spaced therefrom, a pinion secured to the
 130

driven shaft, two intermediate pinions, and two intermediate gear wheels each connected to one of said intermediate pinions and together connecting the first named gear wheel to the first mentioned pinion, a hub extending down from the center of the case and having a chamber formed in its lower end, a worm gear located in said chamber, a governor operated by said worm gear, and a detachable cap closing the lower open end of said chamber, all substantially as shown and described.

2. A spring motor including a containing case with a detachable cover therefor, an upper hub in the cover, a lower hub in the bottom of the case, the latter being provided with two chambers one above the other, the lower chamber being open at the bottom, a detachable cap closing the open bottom of said lower chamber, a driven shaft extending vertically through the case the same being mounted in hubs and extending through both of said chambers with its lower end resting on said cap, a pinion secured around said shaft and located in said upper chamber, a worm gear located in the lower chamber, a governor located outside the case, a hollow shaft located entirely within the case and having connection with said worm gear and concentric with the driven shaft with its ends located in bearings therefor in said hubs, a spring barrel located in the case and surrounding said hollow shaft but rotative independently thereof, a spring located in said barrel with its inner end secured to the hollow shaft and its outer end secured to the barrel, means for revolving the hollow shaft to wind said spring, and a train of gears connecting the barrel with said pinion for driving the driven shaft at a rate of speed greater than that of the spring barrel, all substantially as shown and described.

3. A spring motor substantially as set forth, including a case having a removable cover, a plurality of bearing surfaces located on the inner face of the cover, an upper hub in the central portion of the cover, a central hub located in the bottom of the base and having a chamber in its lower portion which opens downward, a cap for closing said chamber, a hollow shaft extending between said hubs, a spring barrel surrounding said hollow shaft and rotatable thereon, a bevel gear wheel connected to rotate with said hollow shaft and in contact with said bearing surfaces of the cover, a small gear wheel meshing with the first gear wheel, a winding shaft extending through the side of the case with its inner end connected to said small gear wheel, a silent ratchet for retaining said winding shaft from movement in one direction, a spring coiled within said barrel with its inner end secured to the hol-

low shaft and its outer end secured to the barrel, a gear wheel carried by the barrel, a driven shaft extending through the hollow shaft but independently thereof, a pinion secured around the driven shaft, and a train of gears connecting said gear wheel carried by the barrel with the pinion secured to the driven shaft.

4. A spring motor comprising a case, including a detachable cover, an upper hub integral with the cover, a lower hub integral with the bottom of the case, there being an upper and a lower chamber formed in the lower hub, the lower chamber being open at the bottom thereof, a detachable cap for closing the lower chamber, a driven shaft projecting through the case and bearing apertures therefor in the upper and the lower hubs and supported by said cap, a turn-table detachably mounted on the upper end of said shaft, a governor suspended below the case with its shaft extending into said lower chamber, a worm gear located in the lower chamber and geared to the shaft of the governor and to said driven shaft, a hollow shaft concentric with the driven shaft and spaced therefrom and adapted to operate in one direction only, a large bevel gear wheel mounted on the hollow shaft, a second bevel gear meshing at right angles with the first bevel gear, a winding shaft extending out through the wall of the case from the second bevel gear, a silent ratchet for preventing the winding shaft from being turned in but one direction, a barrel located around the hollow shaft and operative independently thereof, said barrel comprising a cup member and a cover closing the open end of the cup member, a spring contained in said barrel with its inner end connected to the hollow shaft and its outer end connected to the barrel, a main gear wheel connected concentric of and located below said barrel and carried thereby, a pinion secured to the driven shaft and located in said upper chamber, a pair of intermediate pinions, and a pair of intermediate gear wheels meshing together and with the main gear and with the first mentioned pinion, and axles for said intermediate gears and pinions which axles are secured in the bottom of the case, there being pockets formed in the bottom of the case for said intermediate gears, all substantially as shown and described.

In testimony whereof I have hereunto subscribed my name to this specification in the presence of two subscribing witnesses.

GEORGE R. KUNKLE.

Witnesses:

ROBT. W. RANDLE,
R. E. RANDLE.

LID PROP

1,267,451 ----- R. J. Prettie,
Filed Mar. 24, 1915,
Patented May 28, 1918.

R. J. PRETTIE.

LID PROP.

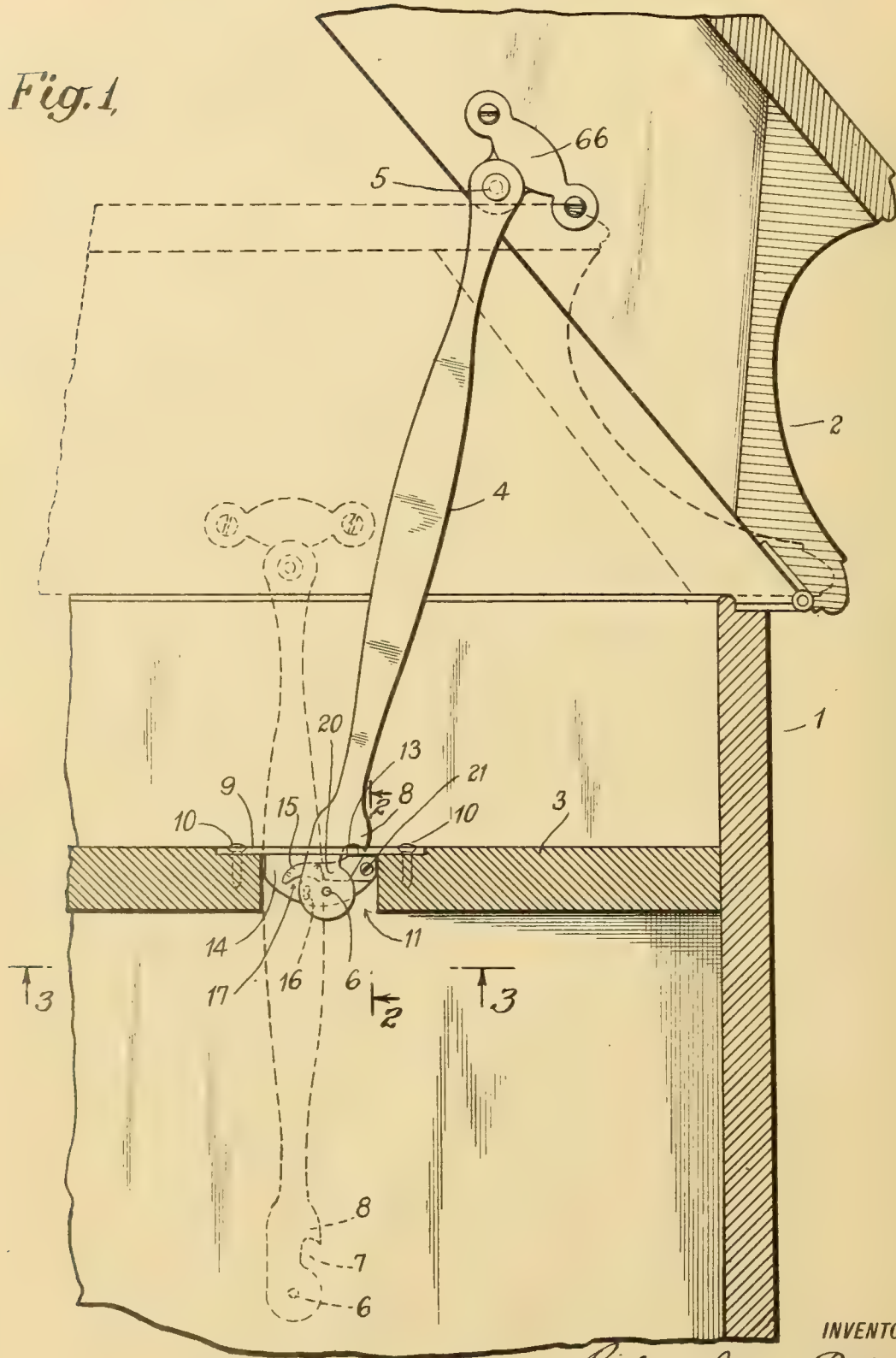
APPLICATION FILED MAR. 24, 1915.

1,267,451.

Patented May 28, 1918.

2 SHEETS—SHEET 1.

Fig. 1



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ATTORNEY

1,267,451.

Patented May 28, 1918.

2 SHEETS—SHEET 2.

Fig. 2,

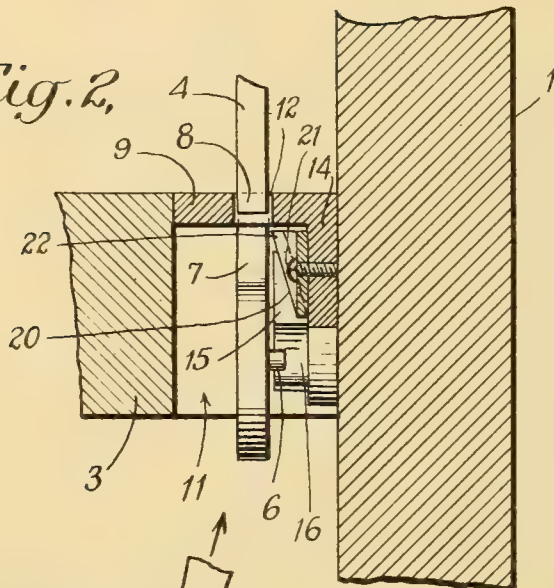


Fig. 3

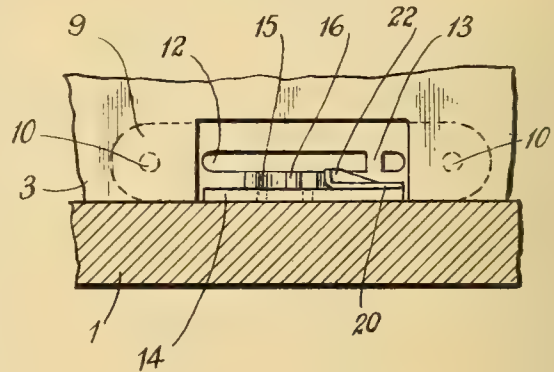


Fig. 4,

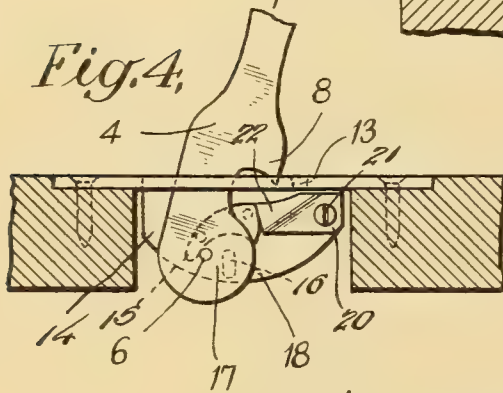


Fig. 5,

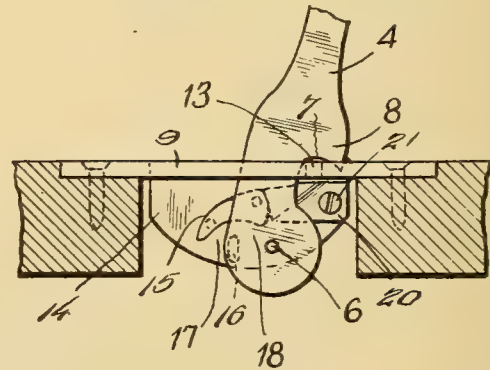


Fig. 6,

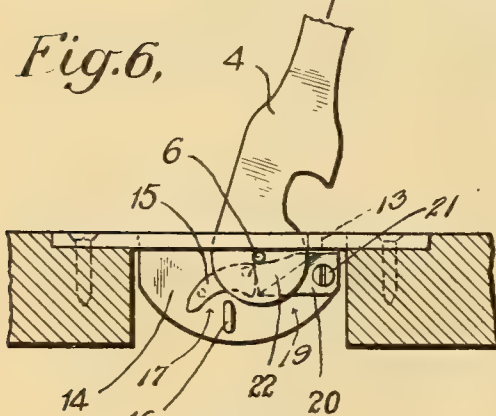


Fig. 7,

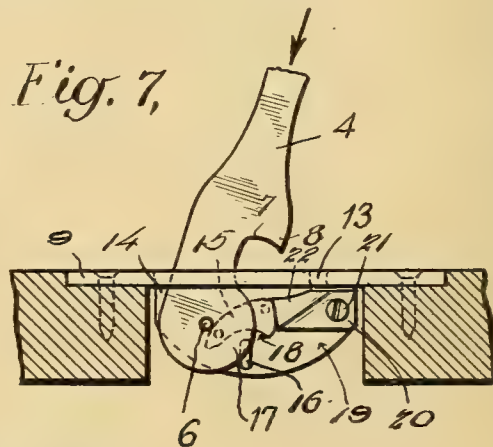
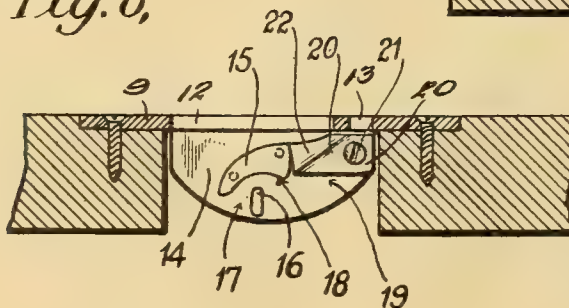


Fig. 8,



INVENTOR
Richard James Prettie.
BY
E. Scherr ATTORNEY

UNITED STATES PATENT OFFICE.

RICHARD JAMES PRETTIE, OF JAMAICA, NEW YORK, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

LID-PROP.

1,267,451.

Specification of Letters Patent.

Patented May 28, 1918.

Application filed March 24, 1915. Serial No. 16,671.

To all whom it may concern:

Be it known that I, RICHARD JAMES PRETTIE, a citizen of the United States, residing at Jamaica, in the county of Queens and State of New York, have invented certain new and useful Improvements in Lid-Props, of which the following is a specification.

My present invention is an improved lid-prop for cabinets and the like, the advantages of which will be apparent to those skilled in the art from the following description in connection with the drawings. In the latter, Figure 1 is a partial vertical section of a cabinet embodying my lid-prop shown in elevation in two positions, with the lid raised and lowered respectively. The remaining figures are detail views on an enlarged scale,—Fig. 2 being a sectional view on the line 2—2 in Fig. 1 looking in the direction of the arrows, Fig. 3 being an underneath plan partly in section on the line 3—3 in Fig. 1, Fig. 4 being an enlarged view of a part of Fig. 1 except that the lid is supposed to be in the act of being raised into the position shown in Fig. 5 (same as in Fig. 1) wherein the prop is supporting the lid. Next Fig. 6 shows the position of the parts due to the slight preliminary additional lifting of the lid preparatory to lowering it from its raised or prop-supported position. Finally Fig. 7 shows the initial stage of the actual lowering of the lid. Fig. 8 the last figure in the drawings, is a longitudinal mid-section partly in elevation, through the escutcheon plate of the device and the supporting shelf part of the cabinet.

I will now describe the specific devices of the drawings. 1 is a cabinet having hinged lid 2 and inside shelf 3. The prop 4 is fashioned from a piece of flat metal and is pivoted by its upper end at 5 to a piece 6 secured by screws to the interior side-wall of the hollow lid 2. 6 is a short pin or stud projecting from the free end of the prop and from the side near the adjacent wall of the cabinet, and is shown in side elevation in Fig. 2. 7 is a recess in the lower side of the prop above this stud to form the toe 8. The prop shown is wide in the middle tapering to the ends but in a direction transverse to the plane of the drawings in Fig. 1 is of even thickness.

9 is an escutcheon plate secured by screws 10 over an opening 11 through the cabinet-shelf. This plate has a longitudinal slot 12

through which the prop can slide endwise, said slot being bridged near its rear end by a bridge-piece 13. When the prop supports the lid in raised position, it does so by its toe 8 bearing on this bridge-piece 13.

The escutcheon plate 9 has a side-piece or flange 14 underneath it and at one side thereof. See Fig. 2. 15 and 16 are two guide-parts (compare Figs. 1, 2 and 8) on the face of this side-piece 14. They form between them an upwardly extending front passage 17 for the prop-pin 6 to travel up into and which, by the relative position of the parts, it is arranged to do as the lid is raised and has nearly reached its final open position. This is the condition shown in Fig. 4. At its top, the passage 17 recurves downwardly to form a shorter descending rear passage 18 which delivers the prop-pin 6 into the open space 19 (see Fig. 8) at the rear of the guide-part 16. Further this carries the whole prop rearwardly so that its toe 8 as shown in Fig. 5 is brought over the bridge-piece 13 as the pin 6 leaves the aforesaid downwardly extending passage 18. In this relation of the parts, the prop is supporting the open lid. Compare Figs. 1, 2 and 5.

20 is a thin spring metal plate (see Fig. 8) secured by screw 21 to the face of the side-piece 14 under the escutcheon plate in back of the guide-part 15. Its upper corner adjacent the guide part 15 is bent outwardly away from the side-piece 14 to form an inclined spring lip 22. Compare Figs. 2, 3 and 8. This comes into play when the lid is lowered. To do this the lid is first raised a trifle higher than its prop-supported position of Fig. 5. This pulls the prop upwardly as in Fig. 6, causing the prop-pin 6 to ride upwardly on the spring lip 22 as on an inclined plane. In doing so, said pin presses the lip toward the side-piece 14 (see Fig. 2) until it snaps over the top edge of the lip, which thereupon springs outwardly so that it now underlies the pin, preventing its return whence it came.

The upper edge of this spring-lip 22 inclines downwardly to be continuous with the downwardly inclined upper side of the guide-part 15. The result is that the weight of the lid, acting through the prop, causes its pin 6 to slide down said combined inclined surfaces. These furthermore are located far enough to the front so that as the prop descends endwise through the escutch-

eon slot 12, its toe 8 is carried forward far enough to pass freely therethrough without abutting against the bridge-piece 13, thus permitting the lid to descend into fully closed position.

Thus the lid can be raised into propped-up position and lowered by the use of only one hand. On lifting the lid, the prop pin follows up into the front passage 17 and delivers the toe 8 into its lid-supporting position over the bridge-piece 13 as the downwardly extending passage 18 delivers the pin into the free space to which said passage leads. The lowering of the lid is equally simple, consisting merely in raising it slightly until the pin 6 has ridden past the upper edge of the inclined spring lip 22 whence the weight of the lid naturally causes it to ride down the incline formed by the parts 22 and 15, thereby simultaneously carrying the prop forward so that it descends freely through the slot in the escutcheon plate until the lid is in fully closed position.

Of course some changes and modifications might be made in the above that are nevertheless within the spirit of this inventive disclosure and these I mean to cover by the annexed claims under the doctrine of equivalents. Further certain of the means might be used without the remainder or in connection with equivalent means.

What I claim is:—

1. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a guide-pin, a support for said toe, stationary guide-members forming an upwardly extending passage for said pin when raising the lid and a downwardly extending passage which delivers the prop into a position wherein its toe supports the lid.

2. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a guide-pin, a support for said toe, stationary guide-members forming an upwardly extending passage for said pin when raising the lid and a downwardly extending passage which delivers the prop into a position wherein its toe supports the lid and a movable part permitting the pin to pass it in upward direction but not to return, said part being arranged to deliver the pin downwardly over the top of the guide-members and to carry the prop into a position wherein its toe is carried out of its lid-supporting position.

3. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a guide-pin, stationary guide-members forming an upwardly extending passage for said pin when raising the lid and a downwardly extending passage which delivers the prop

into a position wherein its toe supports the lid and a spring part which yields to permit the pin to pass it in upward direction but whose upper edge is normally positioned to prevent the return of the pin, said edge being arranged to deliver the pin downwardly over the top of the guide-members and to carry the prop into a position wherein its toe is carried out of its lid-supporting position.

4. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a guide-pin, a support for said toe, guide-members forming an upwardly extending passage for said pin when raising the lid directed to deliver the prop into a position wherein its toe supports the lid.

5. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a guide-pin, a support for said toe, guide-members forming an upwardly extending passage for said pin when raising the lid directed to deliver the prop into a position wherein its toe supports the lid and a movable part permitting the pin to pass it in upward direction but not to return, said part being arranged to deliver the pin downwardly over the top of the guide-members and to carry the prop into a position wherein its toe is carried out of its lid-supporting position.

6. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a guide-pin, guide-members forming an upwardly extending passage for said pin when raising the lid directed to deliver the prop into a position wherein its toe supports the lid and a spring part which yields to permit the pin to pass it in upward direction but whose upper edge is normally positioned to prevent the return of the pin, said edge being arranged to deliver the pin downwardly over the top of the guide-members and to carry the prop into a position wherein its toe is carried out of its lid-supporting position.

7. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a guide-pin, guide-members forming an upwardly extending passage for said pin when raising the lid directed to deliver the prop into a position wherein its toe supports the lid and a spring part which yields to permit the pin to pass it in upward direction but which prevents its return thereby and delivers the pin and prop into a position wherein the toe of the latter is carried out of its supporting position and the prop is permitted to descend.

8. In combination, a lid-prop guided for endwise movement, having a toe for sup-

porting the lid in raised position and a guide-pin, guide-members forming an upwardly extending passage for said pin when raising the lid directed to deliver the prop into a position wherein its toe supports the lid and a spring part which yields to permit the pin to pass it in upward direction but which has a projecting upper edge which when passed by the pin prevents its downward re-
10 turn past the spring, said edge having a downward inclination delivering the pin and prop downwardly over the top of the aforesaid guide means which itself is downwardly inclined to carry the toe of the prop
15 out of its lid-supporting position to permit the prop to descend and the lid to be closed.

9. In combination, a lid-prop guided for endwise movement, having a toe for supporting the lid in raised position and a

guide-pin, guide-members forming an upwardly extending passage for said pin when raising the lid directed to deliver the prop into a position wherein its toe supports the lid and a spring part which yields to permit the pin to pass it in upward direction but which prevents its return thereby and delivers the pin and prop into a position wherein the toe of the latter is carried out of its supporting position and the prop is permitted to descend, a slotted plate forming the guide for the endwise movement of the prop, and a cross-piece across said slot to coact with and support the toe of the prop.

In testimony whereof, I have signed my name to this specification, this 23 day of March, 1915.

RICHARD JAMES PRETTIE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



CABINET FOR PHONOGRAPH RECORDS.

1,267,981 ----- A. J. Crippen,
Filed May 26, 1915,
Patented May 28, 1918.

1,267,981.

2 SHEETS—SHEET 1.

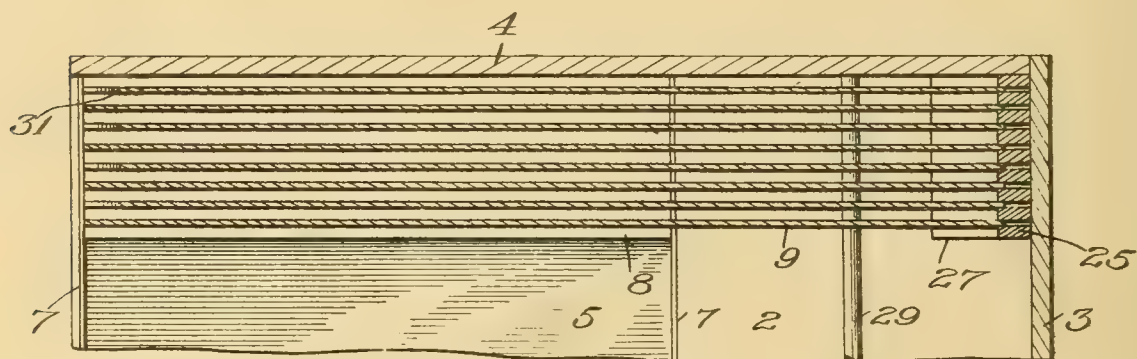
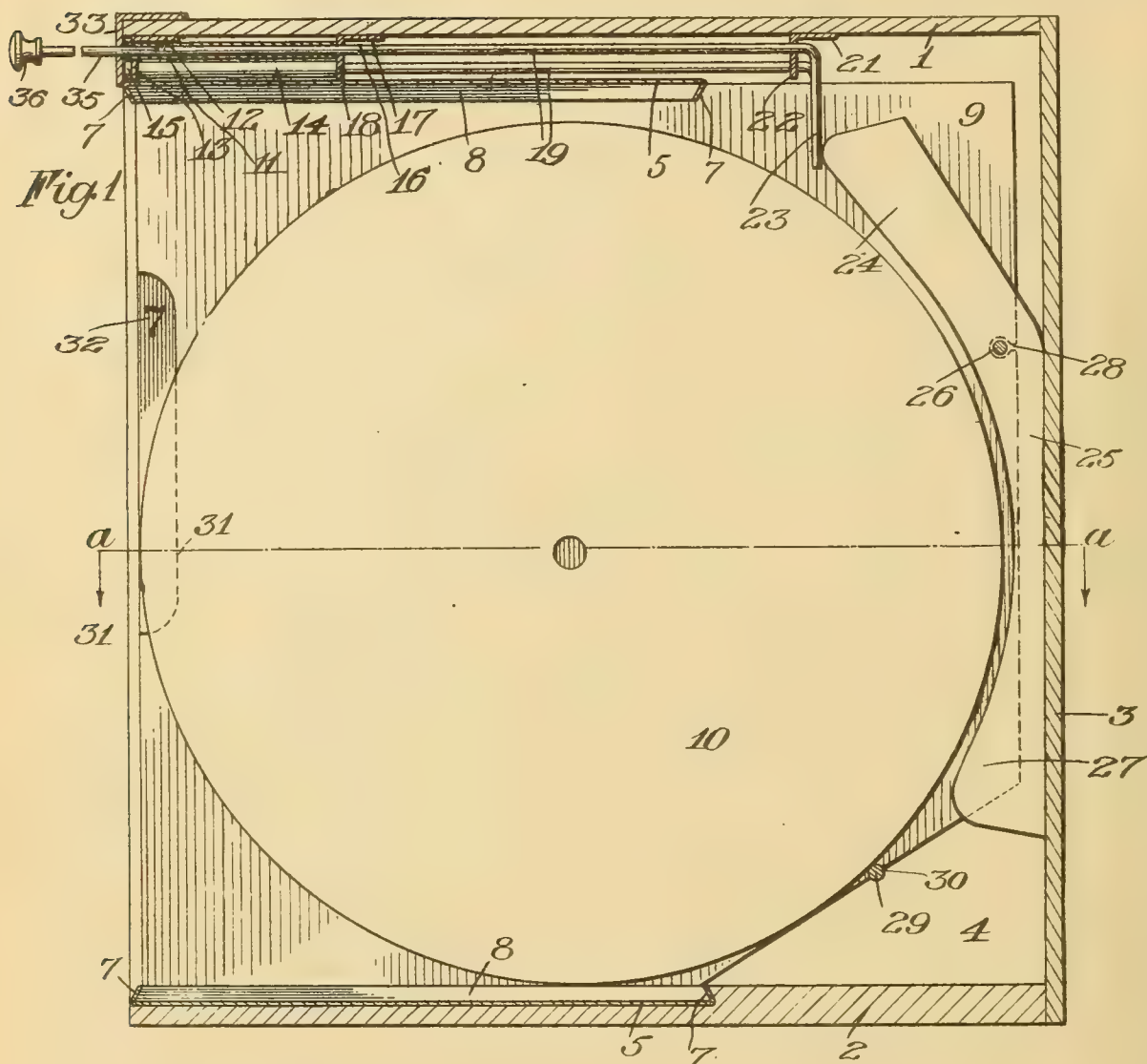


Fig. 4

WITNESSES:

Nelson H. Cope
H. Stonebraker

INVENTOR

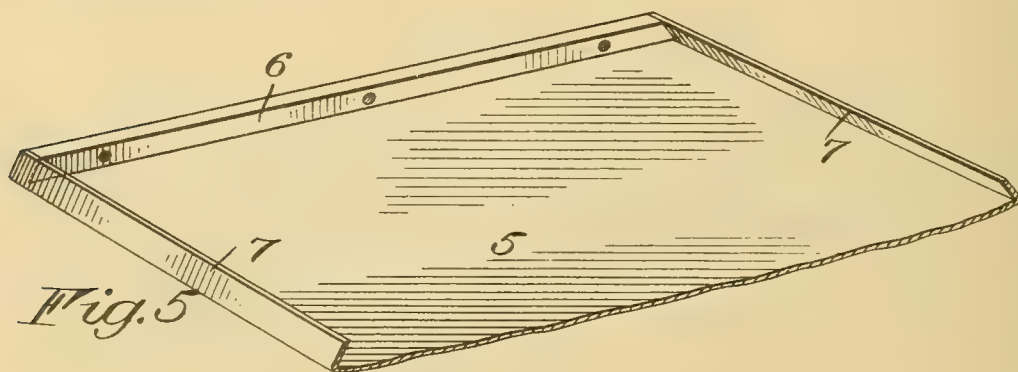
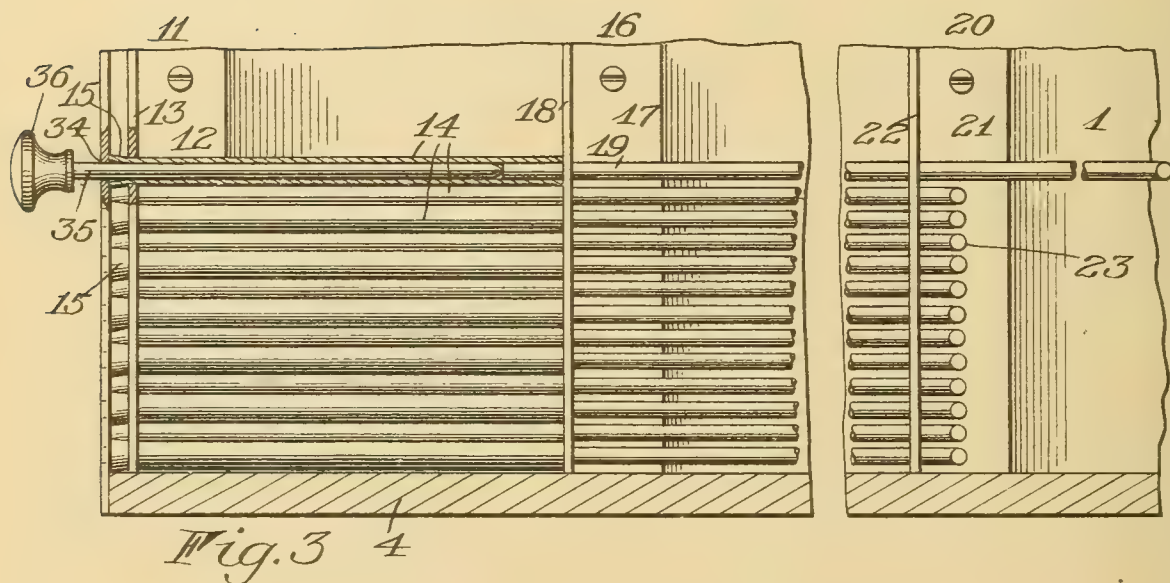
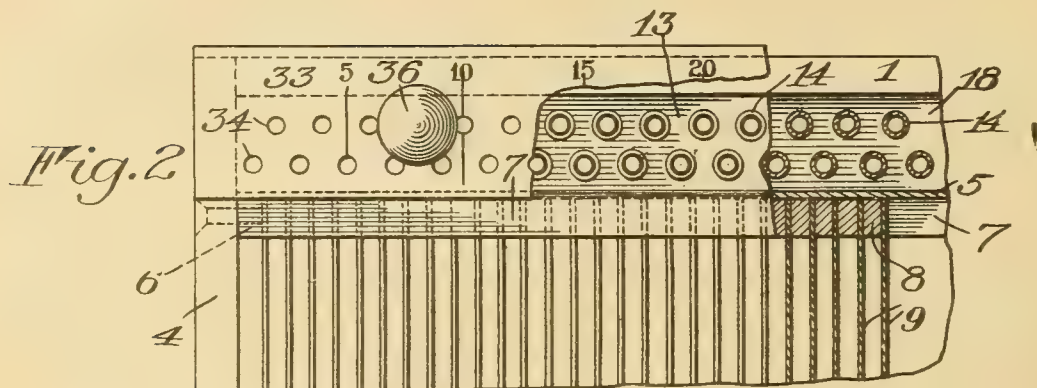
INVENTOR
Arthur J. Crippen

BY
Hend. Dist.
his ATTORNEYS

A. J. CRIPPEN.
CABINET FOR PHONOGRAPH RECORDS.
APPLICATION FILED MAY 26, 1915.

1,267,981.

Patented May 28, 1918.
2 SHEETS—SHEET 2.



WITNESSES:

Nelson H. Copp
W. E. Stonebraker

INVENTOR

Arthur J. Crippen

BY

Shuch & Rich
his ATTORNEYS

UNITED STATES PATENT OFFICE.

ARTHUR J. CRIPPEN, OF ROCHESTER, NEW YORK, ASSIGNOR TO CRIPPEN-RASE CO. INC.,
OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

CABINET FOR PHONOGRAPH-RECORDS.

1,267,981.

Specification of Letters Patent.

Patented May 28, 1918.

Application filed May 26, 1915. Serial No. 30,507.

To all whom it may concern:

Be it known that I, ARTHUR J. CRIPPEN, of Rochester, in the county of Monroe and State of New York, have invented certain
5 new and useful Improvements in Cabinets for Phonograph-Records; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings,
10 forming a part of this specification, and to the reference-numerals marked thereon.

My invention relates to a cabinet for phonograph records and is especially designed for the storage of records of the disk
15 type. One of the main objects of the invention is to provide a cabinet designed to hold and protect safely a large number of records in a minimum amount of space. Another object of the invention is to provide a simple
20 and inexpensive cabinet having individual compartments for storing records in a convenient and readily accessible manner making it possible to eject them by the use of an independent and separable member which
25 can be used to operate any of the various records that is selected. To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the
30 novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a vertical sectional view through the cabinet showing a record in
35 position to be ejected by one of the ejecting levers;

Fig. 2 is a view of a portion of the front of the cabinet partly broken away and partly in section showing the arrangement of the
40 guides for operating devices and the method of spacing the partitions for the records;

Fig. 3 is a fragmentary vertical sectional view showing the method of supporting the hollow guides and the application of the
45 actuating member for moving one of the operating devices;

Fig. 4 is a horizontal sectional view taken on the line *a-a* of Fig. 1, showing the arrangement of the ejecting levers with respect to the partitions for receiving the records, and
50

Fig. 5 is a detail perspective view of a por-

tion of one of the partition holding members.

Similar reference numerals throughout 55 the several figures indicate the same parts.

The cabinet which is preferably rectangular in form consists of a top 1 and a bottom 2 connected by a back 3 and sides 4. Within the cabinet are upper and lower partition 60 receiving members 5 provided with end closing members 6 adapted to be secured to the sides 4 by suitable screws or otherwise. The upper partition receiving member is inverted with respect to the lower member as 65 shown in Fig. 1. The partition receiving members have front and back projections 7 inwardly inclined toward each other and are adapted to receive and retain a series of spacing members, preferably in the form of 70 strips 8 in proper spaced relation to a number of partitions 9 formed of any thin flexible or yieldable material such as paper, or other flexible material suitable for holding a maximum number of records in a minimum 75 amount of space providing a separate compartment for each of said records. The records are held more or less lightly by the frictional engagement of the partitions which are in close relation to each other, 80 affording just enough space in a compartment for the thickness of a record and preventing any looseness or movement of the record in the compartment. The strips 8 are beveled on their ends to engage the in- 85 clined projections 7 which serve to hold the strips against outward displacement. The partitions 9 are cut and spaced at their tops and bottoms to extend into and fit the shapes of the partition receiving members 5 and are 90 held therein by means of the spacing strips clamping the same, the partitions and spacing strips being provided in sufficient numbers to completely fill the cabinet so as to cause the members to be forced and held in 95 position under a slight pressure within or between the sides of the cabinet. The lower partition receiving member is let into the bottom of the cabinet at the front thereof to allow the spacing strips to line up or be 100 held flush with the remaining portion of the bottom of the cabinet as shown in Fig. 1. The records 10 are positioned in their respective compartments between the parti-

tions and are supported by the spacing strips upon which the records rest in the bottom partition receiving member. The spacing strips are substantially of the same thickness as the records in order that all possible space may be utilized in the storing of the records. Positioned between the top partition receiving member and the top of the cabinet at the front thereof is a flanged member 11 provided with a horizontal flange 12 secured to the top of the cabinet and a vertical flange 13 adapted to receive a series of hollow guiding members or tubes 14 flared outwardly as shown at 15 and arranged in two rows, the tubes of one row being staggered relatively to the tubes of the other row as shown in Fig. 2. Spaced in the rear of the flanged member 11 is positioned a flanged member 16 having a horizontal flange 17 secured to the top of the cabinet and a vertical flange 18 adapted to engage the rear ends of the hollow guiding members 14 and to receive the front ends of a series of operating devices in the form of rods 19 corresponding in number and arrangement to the hollow guides and projecting into the guides a short distance and supporting the rear ends of the same as shown in Fig. 3. Another flanged member 20 is positioned in the rear of the member 16 having a horizontal flange 21 secured to the top of the cabinet and a vertical flange 22 adapted to receive and support the rear ends of the operating rods 19. The operating rods are provided with downwardly extending portions 23 adapted to engage the upper end of a lever arm 24 of an ejecting lever 25 pivoted on a shaft 26 journaled in the sides of the cabinet. The ejecting lever is provided with a lower record engaging arm 27, the rear of which normally rests against the back of the cabinet as shown in Fig. 1. The ejecting lever is made to conform on its record engaging face substantially to the periphery of the record and the top arm normally extends far enough away from the back of the cabinet to provide operating space for the same when the bottom arm is thrown outwardly to eject the record. The ejecting levers are of course, positioned on the shaft 26 between each of the partitions to provide individual ejecting members for each of the records.

The shaft 26 is also adapted to pass through the partitions as shown at 28 to provide additional means for holding the partitions against outward displacement. A rod 29 is secured in the sides of the cabinet and extends under the records at the back thereof to support the same and limit their rearward movement as shown in Fig. 1. The partitions are notched out at 30 to engage the rod 29 to form an additional support for the partitions. The front edge of every other partition in the cabinet is cut away a short

distance as shown at 31 to expose a series of record numbers on the edges of each of the non-cut partitions in the manner shown at 32 in Fig. 1. Positioned upon the front and at the top of the cabinet immediately over the partitions is an indicating member 33 provided with a plurality of holes 34 arranged in rows, the holes of one row being staggered relatively to the holes of the other row, said holes registering with the hollow guiding members 14 containing the ends of the operating rods 19. Starting at the left side of the indicating member the holes are laid off in multiples of five as shown in Fig. 2, for the purpose of quickly locating a record in any part of the cabinet. Each compartment is positioned immediately below one of the holes of the indicating member so that in locating a particular record in any one of the compartments through the hole corresponding thereto will readily be seen by glancing upward to the indicating member. As a means for ejecting a record from any one of the compartments of the cabinet, I employ an independent and separable member, here shown in the form of a push rod 35, having a head 36, adapted to be inserted in the guiding members to engage and move the operating rods as shown in Fig. 3.

The push rod is of such length as not to extend entirely through the guiding members when inserted therein, but is made long enough to move the operating rods and the ejecting levers rearwardly their maximum amount without forcing the former entirely out of the guiding members. In this way the guiding members are held against displacement by merely abutting the vertical flange 18 of the flanged member 16.

Heretofore the exterior operating mechanism for ejecting records from cabinets has comprised a series of separately mounted heads or buttons on individual push rods for each record. The objection to this arrangement is that it considerably increases the size of the cabinet over the actual size required for properly storing the records. In order to overcome this objection I provide a detachable member for actuating the several operating rods or devices separately so that said rods may be placed relatively closer together than could be done were the heads or buttons required on the ends thereof.

In the operation of the mechanism for ejecting the records from the cabinet when it is desired to eject a particular record therefrom, the push rod is inserted in the hollow guiding member corresponding in number to the number of the record as found on the partition immediately at the left of the record desired, and by forcing the push rod its full length into the tube the

operating rod will move the top arm of the ejecting lever rearward and force the bottom arm forward to eject the record which is free to move out of the cabinet through the front thereof. When the record is replaced in its proper compartment the ejecting lever is thrown back to its normal position ready to eject the record again when it is desired to remove the same from the cabinet.

I claim as my invention:

1. In a record cabinet, the combination with a series of partitions forming compartments for receiving records, top and bottom removable holding members for said partitions provided with inwardly sloping walls, and spaced strips slidably mounted between said walls in clamping engagement with the partitions, the upper and lower strips being held against movement in a direction toward each other by the walls.

2. In a record cabinet, the combination with a series of partitions forming compartments for receiving records, of interchangeable upper and lower partition holders removably fitted within the cabinet comprising pan-like members, the front and back sides of which are provided with inwardly inclined surfaces, the upper pan-like member being supported in inverted position, and spacing strips having their ends beveled and slidably mounted upon the inclined surfaces between the partitions in clamping engagement with the same, the lower strips being adapted to support said records.

3. In a record cabinet, the combination with a series of partitions forming compartments for receiving records, of spacing strips interposed between said partitions, and guides between which the opposite ends of the strips are slidably mounted, the guides serving to prevent both vertical and

longitudinal displacement of the strips, the partitions being extended in rear of one of the guides.

4. A record cabinet comprising a plurality of record receiving compartments formed of a series of partitions, spacing strips interposed between the partitions and top and bottom holders extending transversely of the partitions independently thereof arranged to receive the ends of the strips, one of the holders being positioned intermediate the front and back of the partitions.

5. In a record cabinet, a series of partitions forming compartments for receiving records, pivotally mounted record ejecting levers for said records, a plurality of tubes mounted independently of the partitions, operating rods having their rear ends positioned to engage said levers and their forward ends projecting into the tubes, and means adapted to be inserted in the forward ends of the tubes to engage and move the operating rods for the purpose of actuating the ejecting levers.

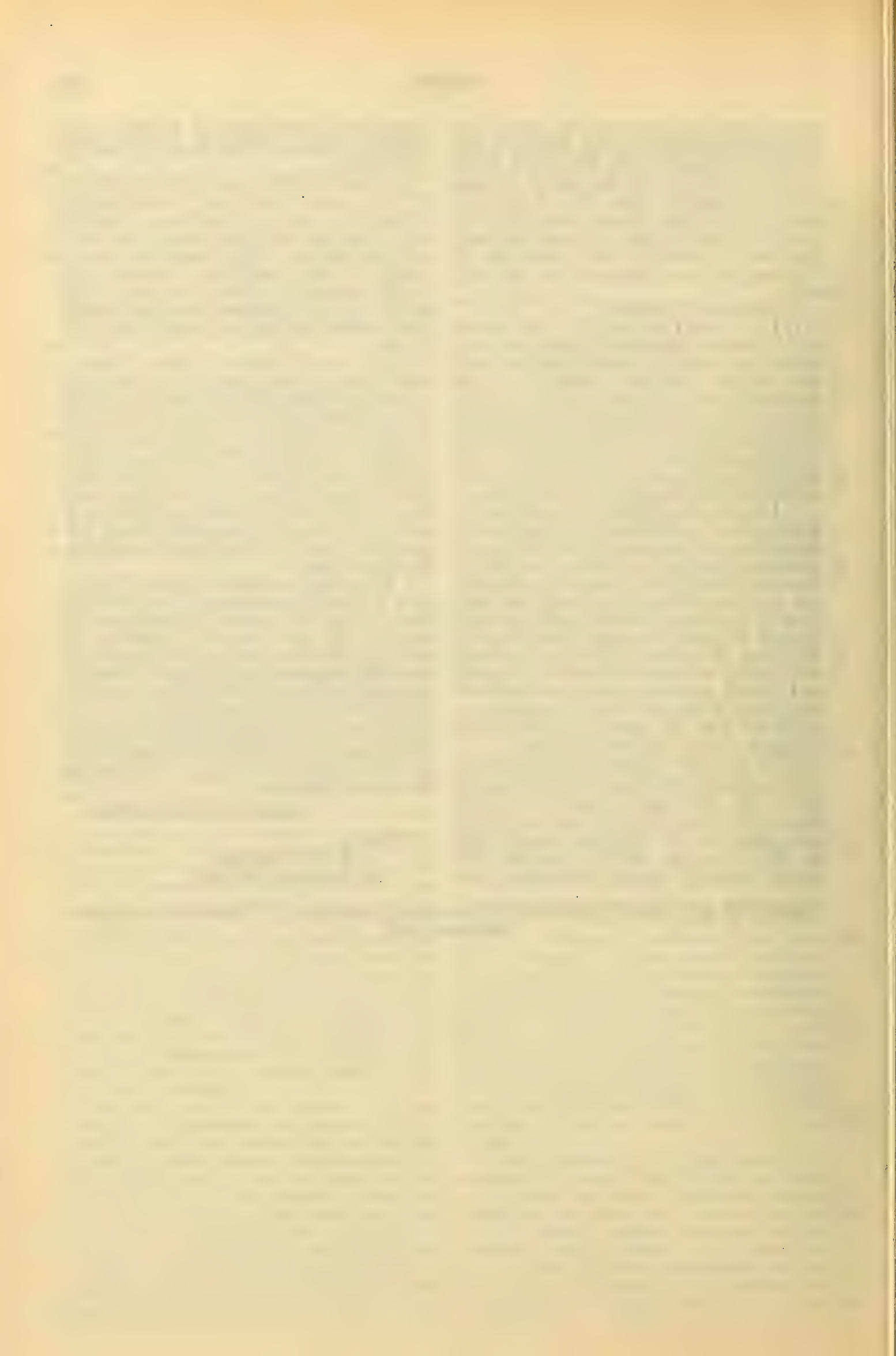
6. In a record cabinet, a series of partitions forming compartments for receiving records, movably mounted record ejecting members for said records, a plurality of tubes, slidably mounted rods having their rear ends operatively engaging the ejecting members and their forward ends projecting into the tubes to support the rear ends thereof, and means adapted to be inserted in the forward ends of the tubes to engage and move the rods for the purpose of actuating the ejecting members.

ARTHUR J. CRIPPEN.

Witnesses:

H. E. STONEBRAKER,
M. MADELINE MILLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



STOP MECHANISM.

1,268,008 ----- J. F. Hitchcock,
Filed Mar. 19, 1917,
Patented May 28, 1918.

J. F. HITCHCOCK.
STOP MECHANISM.
APPLICATION FILED MAR. 19, 1917.

1,268,008.

Patented May 28, 1918.

4 SHEETS—SHEET 1.

Fig. 1

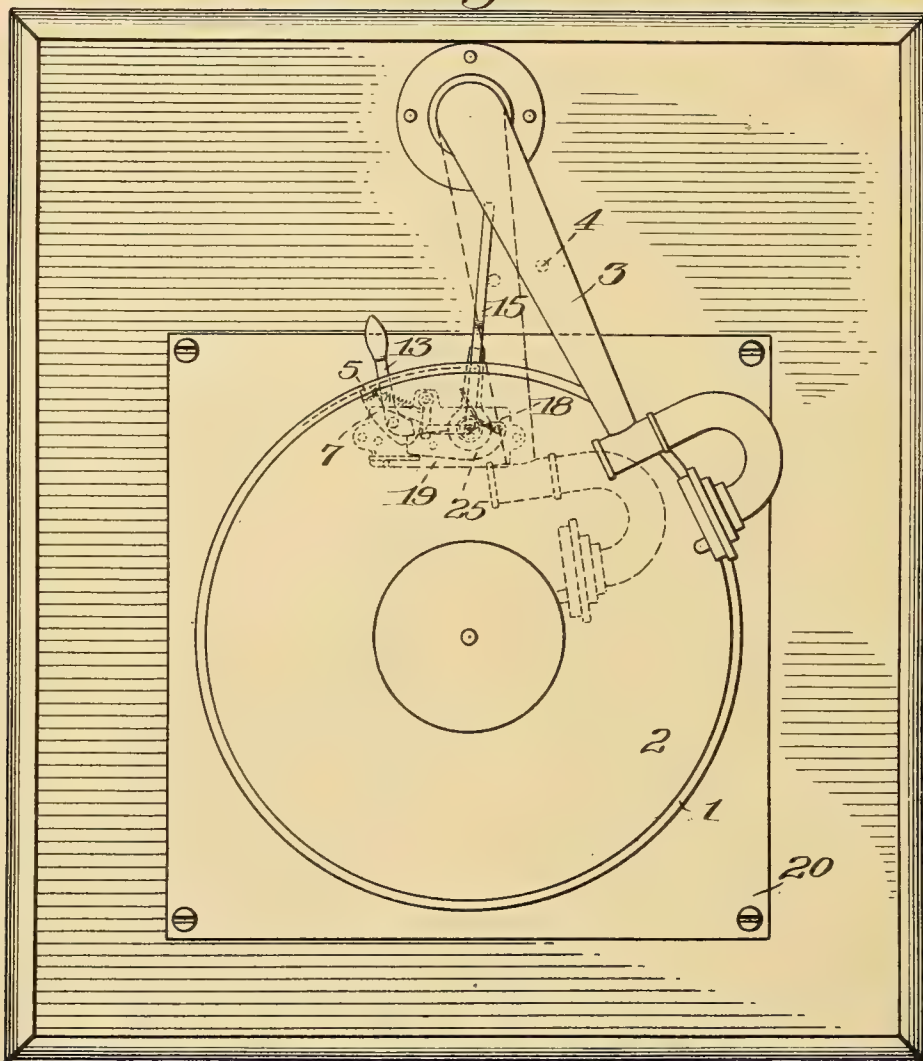


Fig. 5

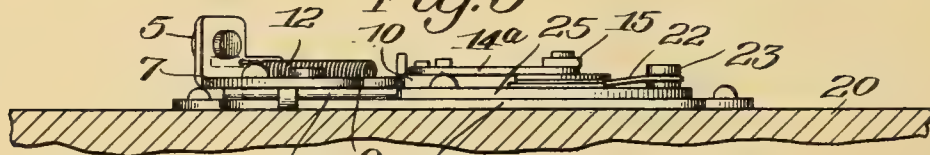
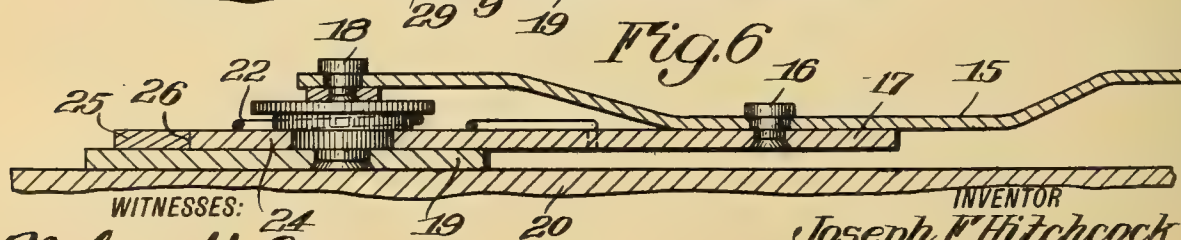


Fig. 6



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APPLICATION FILED MAR. 19, 1917.

1,268,008.

Patented May 28, 1918.

4 SHEETS—SHEET 2.

Fig. 2

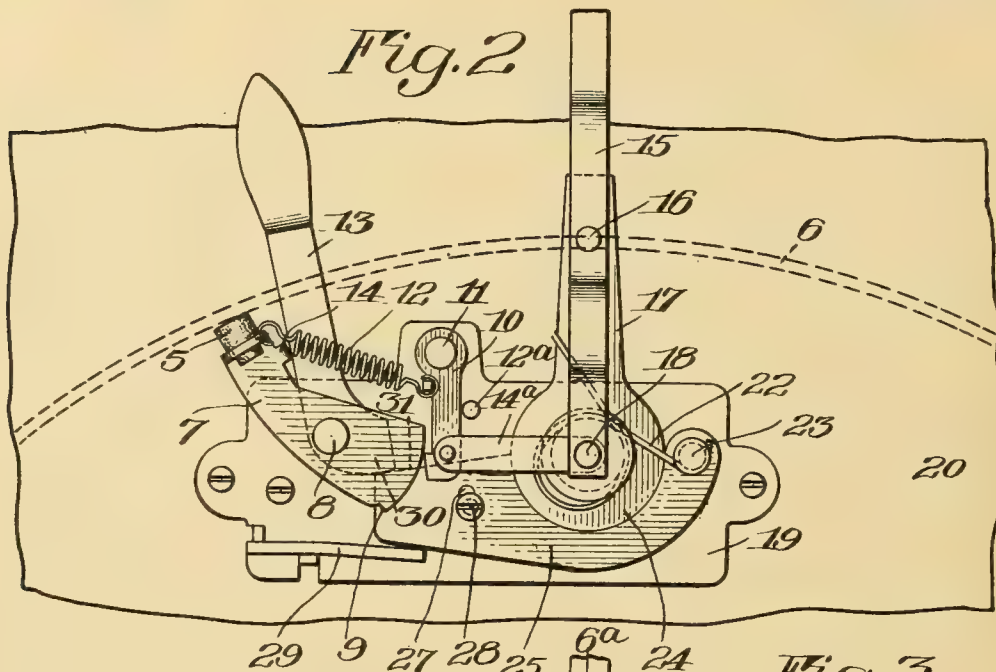


Fig. 3

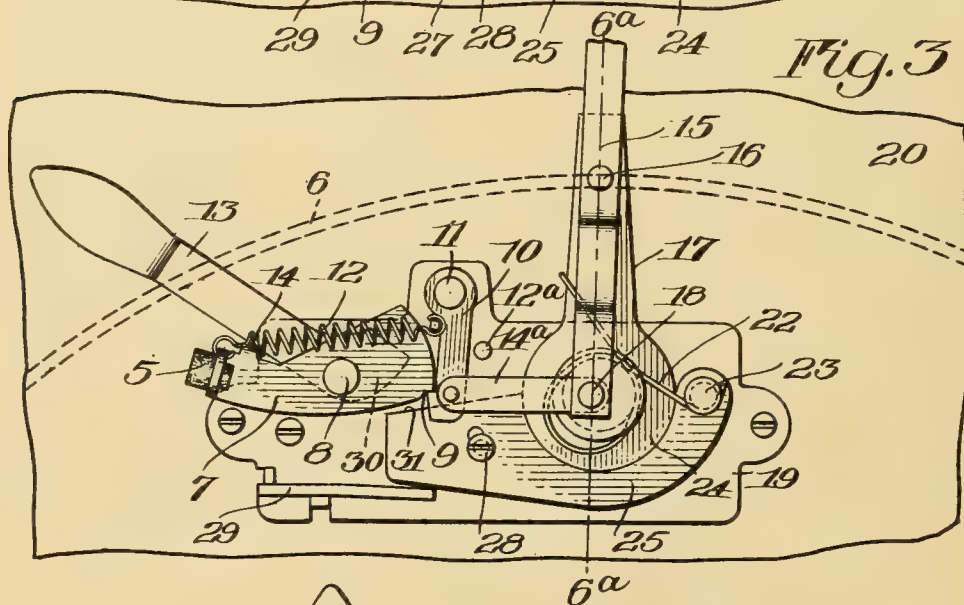
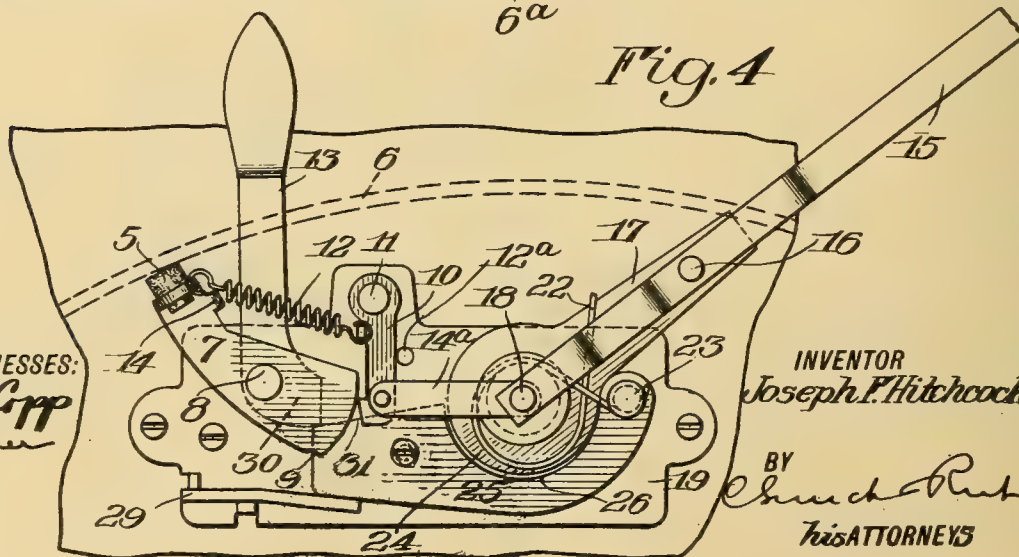


Fig. 4



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APPLICATION FILED MAR. 19, 1917.

1,268,008.

Patented May 28, 1918.
4 SHEETS—SHEET 3.

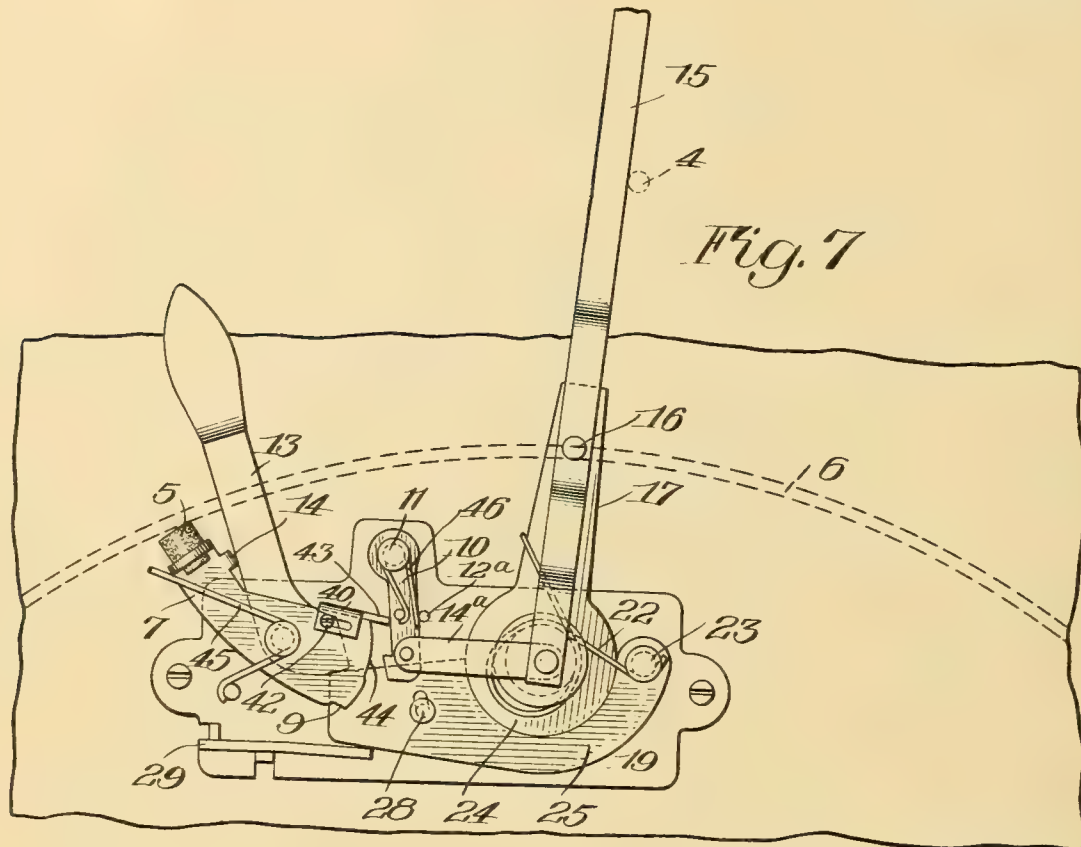


Fig. 7

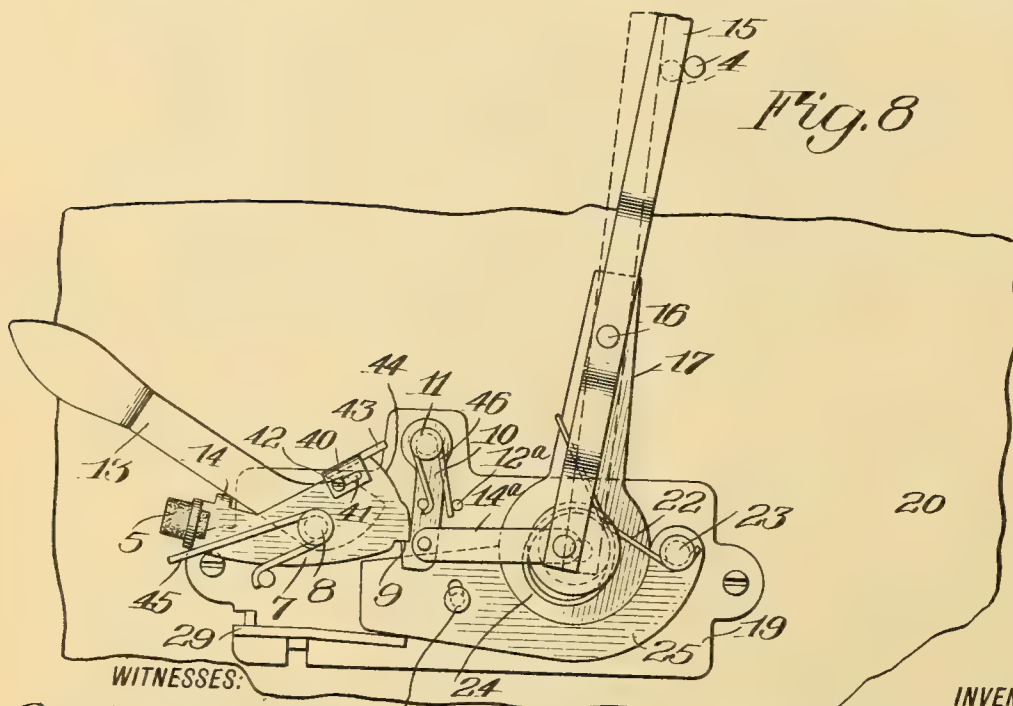


Fig. 8

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STOP MECHANISM.
APPLICATION FILED MAR. 19, 1917.

1,268,008.

Patented May 28, 1918.

4 SHEETS—SHEET 4.

Fig. 9

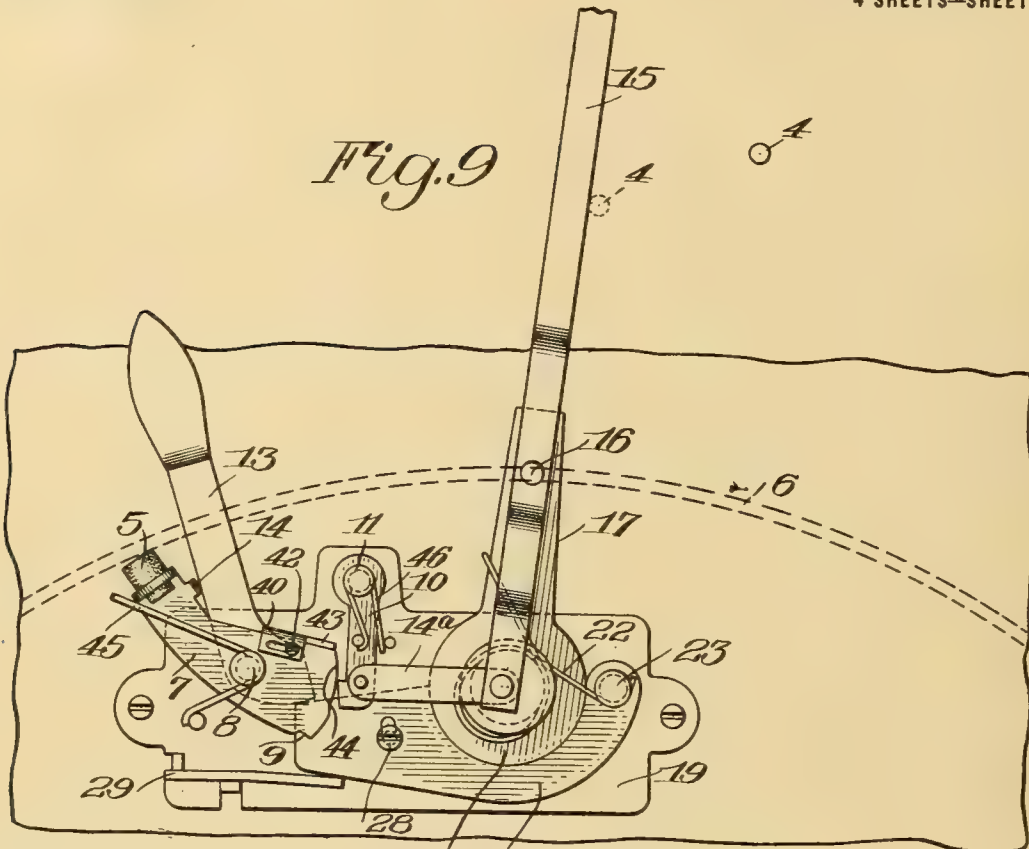


Fig. 11

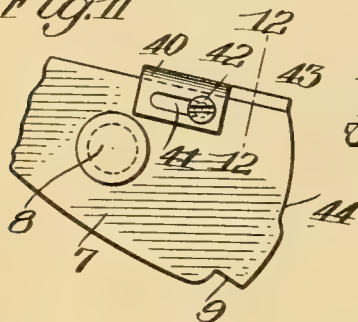


Fig. 12

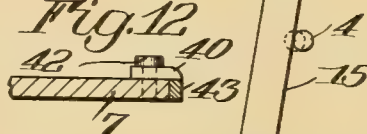
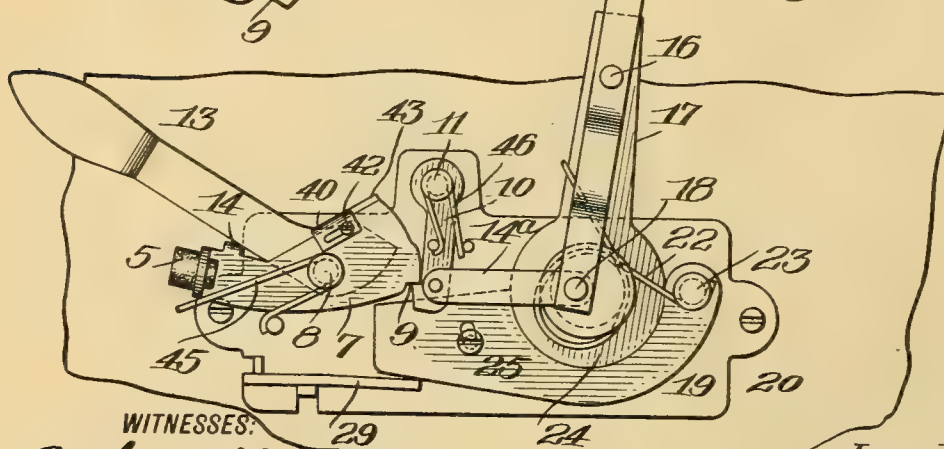


Fig. 10



WITNESSES:

Nelson H. Copp
H. E. Stonebraker

INVENTOR

Joseph F. Hitchcock

BY

Church & Rich
his ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEPH F. HITCHCOCK, OF ROCHESTER, NEW YORK.

STOP MECHANISM.

1,268,008.

Specification of Letters Patent.

Patented May 28, 1918.

Application filed March 19, 1917. Serial No. 155,681.

To all whom it may concern:

Be it known that I, JOSEPH F. HITCHCOCK, of Rochester, in the county of Monroe and State of New York, have invented certain
5 new and useful Improvements in Stop Mechanisms; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a
10 part of this specification, and to the reference characters marked thereon.

My invention has for its object to afford a structure for sound reproducing machines, with more particular reference to mechanisms of the disk or flat record type and the specific purpose of my improvement is to provide for automatically bringing the record to a standstill at any predetermined point in its operation. In a more particular
15 aspect my invention is designed with a view to employing the fewest possible number of parts, and so inter-relating them that the mechanism can be instantly and readily set to stop the machine precisely at the end of the reproducing part of the record, or at
20 any intermediate point in the playing of the record. To these and other ends the invention consists in certain improvements and combinations of parts, all as will be herein-
25 after more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a plan view showing the application of my improvements to a conventional type of sound reproducing machine;

Fig. 2 is an enlarged bottom plan view of the stop mechanism with the parts in the position they assume when the brake is applied;

Fig. 3 is a similar view with the parts in the position they assume when the brake is released;

Fig. 4 is a similar view showing the position of the parts while being adjusted, when the controlling arm is free for movement to any position of the tone arm;

Fig. 5 is a side elevation of the parts illustrated in Fig. 3;

Fig. 6 is a sectional view on the line 6^a—6^a of Fig. 3;

Fig. 7 is an enlarged bottom plan view of a modified form, showing the brake applied;

Fig. 8 is a similar view with the brake released;

Fig. 9 is a view similar to Fig. 7 with the parts differently adjusted;

Fig. 10 is a view similar to Fig. 8 with the parts adjusted as in Fig. 9;

Fig. 11 is a plan view of the adjusting means for timing the release, and

Fig. 12 is a sectional view on line 12—12 of Fig. 11.

Similar reference characters throughout the several views indicate the same parts.

The invention may be carried out in a variety of ways, being applicable not only to the various types of spring motor and other mechanically driven types, but also to electrically driven machines as well, where it is desirable to stop operation of the motor at any instant, and by way of illustration I have shown one adaptation of my improvements practically as applied to a disk record type of apparatus. 1 designates the usual table or rotary support, while 2 is a record arranged thereon and 3, the swinging tone arm carrying a suitable projection 4 that actuates the stop mechanism in a manner that will presently appear more fully. 5 is a brake in the form of a shoe arranged for engagement with the inner surface of the flange or shoulder 6 on the table 1, and the brake is mounted on a brake lever 7 which is preferably pivoted at 8 or may be otherwise movably mounted so as to permit it to be withdrawn from braking position to its released position as indicated in Fig. 3. The brake lever 7 is provided with a notch or shoulder 9 with which coöperates a retaining latch 10 that is pivotally mounted at 11, and 12 is a spring connecting the outer end of the brake lever with the latch 10 and tending to move said parts normally to the position shown in Fig. 2, where the brake lever is in engagement with the record table or support and the latch is in engagement with the brake lever. Movement of the latch in the opposite direction is prevented by the stationary pin or stop 12^a. 13 is a setting lever mounted co-axially with reference to the brake lever 7 and arranged when moved to the left of Fig. 2 to engage a flange or projection 14 on the brake lever and move the latter to the position shown in Fig. 3, or until the latch 10 engages over the notch or shoulder 9 to retain the brake lever in released position. Connected to the latch 10 is a link 14^a which is in turn connected to the inner end of a controlling arm 15, while the latter is pivotally mounted at

16 upon a suitable carrier 17 that is also pivotally mounted upon the base upon an axis that coincides with the axis 18 when the parts are in the position of Fig. 2, so that the arm can be adjusted without changing the position of the latch, and at the same time permitting movement of the latch to vary the position of the arm. The several parts of the stop mechanism already described as well as those which are to be set forth later are mounted upon a base plate 19 which is suitably attached to the top of the frame 20 underneath the rotary table as shown in Fig. 1. 22 designates a spring having one end connected to a post 23 and its opposite end to the carrier 17 and acting with a tendency to move the latter to the right from the position shown in Fig. 2, when released as indicated in Fig. 4. The carrier 17 is normally held against any such movement, and to this end it is provided with a concentric gripping surface 24 which coöperates with a friction lock 25. The latter is preferably in the form of a lever pivoted about the axis 23 and having a curved surface 26 which frictionally engages the aforementioned gripping surface on the carrier. Friction lock 25 is slotted at 27 for engagement with a pin or projection 28 which limits its movement in opposite directions and 29 is a leaf spring engaging the outer end of the friction lock and acting to move the latter normally into gripping relation with the carrier as shown in Fig. 2. The friction lock is moved against the action of the spring 29 in order to release the carrier 17, by the setting lever 13 which is moved to the right from the position shown in Fig. 2. With such operation the inner end or tail portion 30 of the setting lever engages the adjacent surface 31 of the friction lock causing the latter to swing inwardly about its axis 23 as shown in Fig. 4. This releases the friction lock from engagement with the carrier 17 permitting the latter and also the controlling arm 15 to swing to the right under the action of the spring 22. After the parts are set to their respective positions, as shown for instance in Fig. 3, if the outer end of the controlling arm is moved to the left of said figure, the latch 10 is swung to the right permitting the brake lever to move the brake into engagement with the record table.

The operation of the mechanism may be described briefly as follows: Starting with the parts in the position shown in Fig. 2, upon placing a record upon the table, the tone arm is adjusted manually to the end of the playing portion of the record. The setting lever 13 is then moved to the right with reference to Fig. 2, causing the friction lock 25 to move away from the carrier 17, after which the spring 22 actuates the carrier 17 and the controlling arm 15 to the right with reference to Fig. 2 until the controlling arm is in engagement with the stop or projection 4 on the tone arm. The brake is then released by throwing the setting lever 13 to the left of the position shown in Fig. 2, actuating the brake lever to the position shown in Fig. 3 where it is retained by the latch 10, and the slight movement of latch 10 necessary to engage the brake lever, causes a corresponding slight movement of the arm 15, so that the latter will be engaged slightly in advance of the position to which it is preliminarily set, and thus insures stopping the mechanism, by withdrawing the latch fully, when playing of the record is completed. The tone arm is then set to starting position and the operation of the machine commenced. When the tone arm, in its progress over the record, shall have nearly reached the predetermined position of adjustment, its projection 4 engages the controlling arm 15 and moves the latter to the left with reference to Fig. 3, that is to say, the outer end of the tone arm is moved to the left about the axis 16. This causes the latch 10 to be swung away from the brake lever as shown in Fig. 2, until it entirely disengages the shoulder 9, entirely releasing the brake lever which is thereupon forced into engagement with the rotary table by the spring 12. This same latch mechanism and arrangement of controlling arm may likewise be applied to an electrically controlled instrument by arranging for governing the electric circuit through the movements of the latch. It is sometimes desirable to provide for stopping the record either in advance of or after the end of the playing portion is reached, and to accomplish this, I afford an adjusting means for varying the relation of the initial position to which the controlling arm is set with the position at which the record is stopped, or in other words, varying the additional movement or overthrow of the controlling arm, subsequently to its initial setting, which is caused by movement of latch 10 into locking engagement with the brake lever. This is accomplished by an adjustable member or plate 40 mounted on brake lever 7, as seen in Figs. 7 to 12 inclusive. The member 40 is adjustable by a slot 41 and screw 42 and carries a projection or end portion 43 which engages the latch 10, when adjusted outwardly, as shown in Figs. 7 and 8. The brake lever 7 is cut away to afford a recess 44, into which the latch 10 projects, when the adjustable plate 40 is moved inwardly as shown in Figs. 9 and 10. Assuming the plate 40 to be adjusted as in Figs. 7 and 8, and that the arm 15 has been adjusted against the tone arm projection 4, when the setting lever is moved to release the brake lever as shown in Fig. 8, the controlling arm moves from the position shown in dotted

lines to that shown in full lines. This causes the arm 15 to be engaged by the tone arm projection 4 early with reference to the end of the playing portion, or in advance of the end of the playing portion. By adjusting the parts as shown in Figs. 9 and 10 with the plate 40 withdrawn, the overthrow of the controlling arm when the latter is engaged with the brake lever, is slight, as indicated by the dotted and full lines of the projection 4 in Fig. 10, so that stopping of the record, with reference to the end of its playing portion is delayed or retarded. Thus, by adjusting the plate 40 outwardly, the stopping operation is made earlier, with reference to the selected position of the tone arm on the record, and by adjusting the plate 40 inwardly, the stopping operation is delayed. In the modified arrangement of the figures just described, the brake lever and latch are actuated by separate springs 45 and 46 respectively.

I claim as my invention:

1. In a stop mechanism for sound reproducing apparatus, the combination with a brake and movable brake lever, of a movable retaining latch arranged to cooperate with the brake, an adjustable spring actuated controlling arm connected to the latch, a friction lock acting to hold the controlling arm in adjusted position, and a setting lever operatively associated with the brake lever and the friction lock and acting both to release the friction lock and to move the brake lever to released position.

2. In a stop mechanism for sound reproducing apparatus, the combination with a brake and movable brake lever, of a movable retaining latch arranged to cooperate with the brake lever, an adjustable spring actuated controlling arm connected to the latch, a friction lock acting to hold the controlling arm in adjusted position, and a setting lever operatively associated with the brake lever and the friction lock and affording means for alternately releasing the friction lock and moving the brake lever to released position.

3. In a stop mechanism for sound reproducing apparatus, the combination with a brake and movable brake lever, of a movable retaining latch arranged to cooperate with the brake lever, an adjustable spring actuated controlling arm connected to the latch and adjustable without changing the position of the latch, a friction lock acting to hold the controlling arm in adjusted position and a setting lever operatively associated with the brake lever and the friction lock and affording means for alternately releasing the friction lock and moving the brake lever to released position.

4. In a stop mechanism for sound reproducing apparatus, the combination with a brake and movable brake lever, of a mov-

able retaining latch arranged to cooperate with the brake lever, an adjustable spring actuated controlling arm connected to the latch and adjustable without changing the position of the latch, a friction lock acting to hold the controlling arm in adjusted position and a setting lever operating when moved in one direction to release the friction lock and when moved in the opposite direction to move the brake lever to released position where it is engaged by the latch.

5. In a stop mechanism for sound reproducing apparatus, the combination with a brake and movable brake lever, of a movable retaining latch arranged to cooperate with the brake lever, a spring actuated pivoted carrier having a gripping surface, a spring actuated arm pivotally mounted on the carrier and connected to said latch, a spring controlled movable friction lock having a curved surface engaging said gripping surface on the carrier, and a movable setting lever acting when moved in one direction to engage and move the friction lock and when oppositely moved, to engage and effect movement of the brake lever.

6. In a stop mechanism for sound reproducing apparatus, the combination with a brake and pivoted brake lever, of a pivoted retaining latch arranged to engage and hold the brake lever in released position, a spring actuated pivoted carrier having a concentric gripping surface, a spring actuated arm pivotally mounted on the carrier, a link connecting said arm and said latch, a spring controlled pivoted friction lock having a curved surface adapted to frictionally engage said concentric surface on the carrier to hold it against movement, a setting lever pivoted coaxially of the brake lever and movable into engagement with the free end of the friction lock, and a projection on the brake lever located in the path of the setting lever when the latter is moved in the opposite direction to the friction lock.

7. In a stop mechanism for sound reproducing apparatus, the combination with a movable latch, an adjustable spring actuated controlling arm connected to the retaining latch, a friction lock acting to hold the controlling arm in adjusted position, and a setting lever operatively associated with the friction lock.

8. In a stop mechanism for sound reproducing apparatus, the combination with a movable latch, of an adjustable spring actuated controlling arm connected to the latch, and adjustable without changing the position of the latch, a friction lock acting to hold the controlling arm in adjusted position, and a setting lever operatively associated with the friction lock.

9. In a stop mechanism for sound reproducing apparatus, the combination with a

pivoted latch, of a spring actuated carrier having a concentric gripping surface, a spring actuated arm pivotally mounted on the carrier, a connection between said arm and said latch, a spring controlled pivoted friction lock having a curved surface adapted to frictionally engage said concentric surface on the carrier to hold it against movement, and a setting lever movable into engagement with the free end of the friction lock.

10. In a stop mechanism for sound reproducing apparatus, the combination with a

brake and movable brake lever, of a movable retaining latch coöperating with the brake lever, an adjustable member on the brake lever coöperating with the latch to vary the position thereof when the brake lever is released, an adjustable spring actuated controlling arm connected to the latch and having its position controlled thereby, and a lock governing the adjustable controlling arm and acting to hold it in adjusted position.

JOSEPH F. HITCHCOCK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

STOPPING ATTACHMENT FOR TALKING MACHINES.

1,268,121 ----- H. Hubbell,
Filed June 27, 1916,
Patented June 4, 1918.

H. HUBBELL.
STOPPING ATTACHMENT FOR TALKING MACHINES.
APPLICATION FILED JUNE 27, 1916.

1,268,121.

Patented June 4, 1918.

Fig. 1

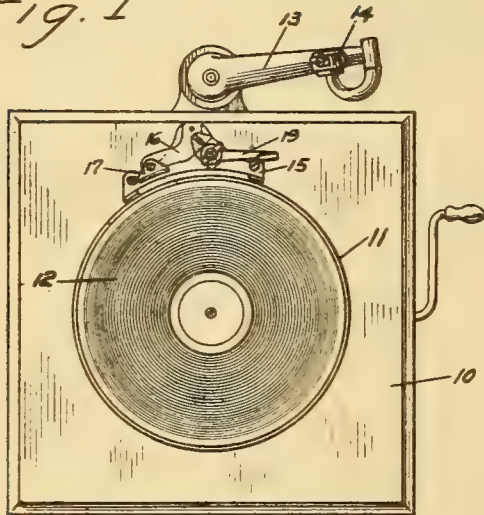


Fig. 2

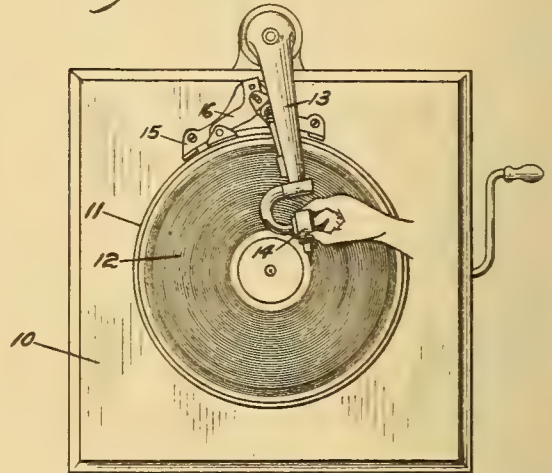


Fig. 3

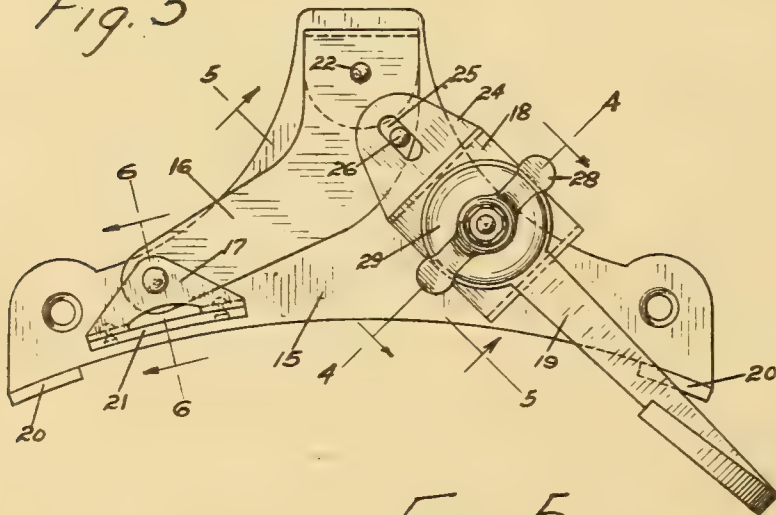


Fig. 4

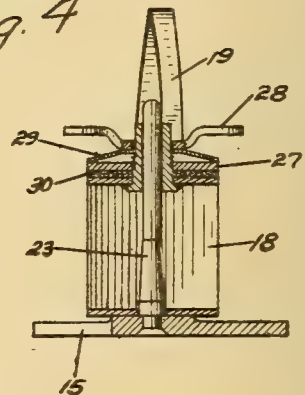


Fig. 5

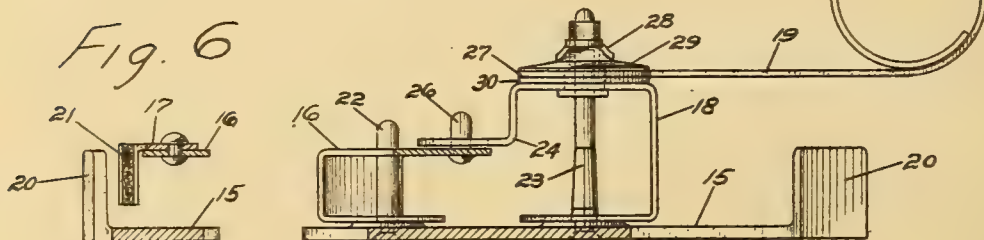
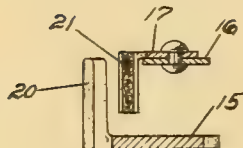


Fig. 6



WITNESS

Charles F. Hayden

INVENTOR

Harvey Hubbell

BY

A. M. Wooster
ATTORNEY

UNITED STATES PATENT OFFICE.

HARVEY HUBBELL, OF BRIDGEPORT, CONNECTICUT.

STOPPING ATTACHMENT FOR TALKING-MACHINES.

1,268,121.

Specification of Letters Patent. Patented June 4, 1918.

Application filed June 27, 1916. Serial No. 106,133.

To all whom it may concern:

Be it known that I, HARVEY HUBBELL, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Stopping Attachments for Talking-Machines, of which the following is a specification.

This invention has for its object to provide a simple and inexpensive stopping attachment adapted to be secured to the top of the case of any talking machine, which may be set to stop the rotation of the turntable at the end of a record or after a half or any other portion of a record has been played by the movement of the tone arm and without appreciable resistance to the tone arm.

With this end in view I have devised the novel attachment which I will now describe, referring to the accompanying drawing forming a part of this specification and using reference characters to indicate the several parts:

Figure 1 is a plan view of a talking machine with my novel attachment in place thereon, the tone arm and sound box being out of operative position;

Fig. 2 a similar view showing the manner in which the tone arm coöperates with the stopping attachment in setting the latter;

Fig. 3 a plan view of the attachment on an enlarged scale;

Fig. 4 a section on the line 4—4 in Fig. 3, looking in the direction of the arrows;

Fig. 5 a section on the line 5—5 in Fig. 3, looking in the direction of the arrows, and

Fig. 6 is a section on the line 6—6 in Fig. 3, looking in the direction of the arrows.

10 denotes the case of a talking machine, 11 the turntable, 12 a record thereon, 13 the tone arm, which swings in the horizontal plane, and 14 the sound box, which is pivoted to the free end of the tone arm to swing in the vertical plane. These parts may be of any ordinary or preferred construction, my present attachment being equally adapted to all machines using a swinging tone arm.

My novel attachment comprises essentially a plate 15, a brake lever 16, a brake shoe 17, an operating member 18 and a stopping arm 19. The plate is provided

with holes to receive screws by which it is attached to the case and with upturned lugs 20 which are set in close relation to the edge of the turntable and act as guides to properly aline the plate in attaching it in place. The brake shoe is provided with a friction facing 21 adapted to bear against the edge of the turntable and is pivoted to one arm of the brake lever. This lever is in general form a bell crank lever, one arm being longer than the other and the brake shoe being pivoted to the outer end of the long arm. The short arm of this lever is pivoted to swing on a pin 22 extending upward from the plate. I have shown the brake lever as blanked out and formed from sheet metal and the short arm as made U-shaped in order to give a double bearing on the pin and insure steadiness of movement. The operating member is likewise blanked out and formed from sheet metal, is made substantially U-shaped, and is adapted to oscillate on a pin 23 extending upward from the plate. The operating member is provided with an arm 24 having near its end a slot 25 which is engaged by a pin 26 extending upward from the brake lever. Oscillation of the operating member will cause the brake shoe to be swung toward or from the edge of the turntable. As seen in the drawing, the turntable rotates from left to right. It is important to note that neither the tone arm nor the action of a spring is depended upon to stop the rotation of the turntable. The tone arm simply places the brake shoe in engagement with the turntable. The instant this engagement takes place the turntable itself causes the brake shoe to produce a wedging action. This is owing to the fact that the pivotal points of the operating member and of the brake shoe to the operating lever are on opposite sides of the general longitudinal line of the short arm of the lever, which if extended would intersect, or approximately intersect, the pivotal points of the operating lever and the turntable. The instant the brake shoe is caused to engage the edge of the turntable, the friction of the turntable on the brake shoe will carry the latter in the direction in which the turntable is moving, but as the pivotal point of the brake shoe to the brake lever cannot pass a line intersecting the pivotal points of the turntable and the brake lever, there is a

wedging action which immediately stops the rotation of the turntable. In other words, the action of the operating member upon the brake lever is not depended upon to stop the
 5 rotation of the turntable, the function of the operating member being simply to oscillate the brake lever sufficiently to place the brake shoe in engagement with the turntable, after which it is the action of the turntable on the brake shoe in carrying it forward in the direction in which the turntable is rotating that stops the rotation of the latter. The stopping arm is provided with a head 27 which is pivoted on pin 23
 15 above the operating member. The upper end of the pin is threaded and is engaged by a wing nut 28 which clamps a spring washer 29 down upon the head, a friction washer 30 being interposed between the head and the top of the operating member. This is in order to enable the stopping arm to be moved independently of the operating member, while at the same time sufficient frictional engagement between the stopping arm
 25 and the operating member is provided to cause the stopping arm, when engaged by the tone arm, to oscillate the operating member, said member in turn swinging the brake lever and causing engagement of the brake shoe with the turntable. The outer end of the stopping arm is suitably shaped to adapt it for engagement by the tone arm. In the present instance I have shown the outer end of the tone arm as reduced in
 35 width and bent to form a coil. It should be understood, however, that the special design or configuration of the several members is wholly immaterial so far as the principle of the invention is concerned.

40 The operation is as follows: Fig. 1 shows the normal or inoperative position of the parts with a record upon the turntable ready to be played. To set the stopping attachment, the operator swings the sound box over into operative position and then swings
 45 the tone arm inward, as in Fig. 2, until the needle will register with the groove in the record near its inner end, if it is desired to play the entire record, or with the mid-length or any other portion of the groove if it is not desired to play the entire record. As the tone arm is swung inward, it picks up the stopping arm of the attachment and carries it with it as far inward as the tone arm
 50 is moved. The operator then swings the tone arm away from the stopping arm, leaving the latter set. The tone arm is then set with the needle near the outer end of the groove in the record in the usual manner.

60 The tone arm, as it swings inward in playing the record, moves toward the stopping arm, picks up the latter and carries it forward with it. The degree of frictional engagement of the stopping arm with the operating member is of course determined by
 65

adjustment of the wing nut. It must be sufficient, however, to cause the operating member to be oscillated by the stopping arm, the effect of which is to swing the brake arm inward and cause the brake shoe to engage the
 70 edge of the turntable, after which the turntable itself carries the brake shoe forward and the brake shoe stops the rotation of the turntable.

Having thus described my invention, I
 claim:—

1. A stopping attachment for talking machines having a turntable and a tone arm, comprising a bell crank brake lever having long and short arms and pivoted to swing on
 80 its short arm, a brake shoe pivoted to the free end of said lever and adapted to contact with the turntable, an operating member having pivotal connection with the brake lever, and a stopping arm having frictional
 85 connection with the operating member and a head in the path of movement of the tone arm, the pivotal points of the operating member and of the brake shoe to the brake lever lying on opposite sides of a line longitudinal to the short arm of said lever, substantially as described, for the purpose set forth.

2. An attachment of the character described, comprising a bell crank brake lever
 95 having long and short arms and pivoted to swing on its short arm, a concave brake shoe pivoted to the long arm of said lever, and an operating member having pivotal connection with said lever, the pivotal points of the
 100 operating member and of the brake shoe to the brake lever lying on opposite sides of a line longitudinal to the short arm of said lever, so that actuation of the operating member will cause the brake shoe to engage
 105 the edge of a turntable after which the turntable will carry the shoe forward and produce a wedging action.

3. An attachment of the character described, comprising a bell crank brake lever
 110 having long and short arms and pivoted to swing on its short arm, a brake shoe pivoted to the long arm of said lever, an operating member having pivotal connection with the brake lever, the pivotal points of the operating
 115 member and of the brake shoe to the brake lever lying on opposite sides of a line longitudinal to the short arm of said lever, and a stopping arm adapted to be engaged by a tone arm and to be moved independently of the operating member, but normally oscillating said member by frictional engagement.

4. An attachment of the character described, comprising a bell crank brake lever
 125 pivoted to swing on one arm, a brake shoe pivoted to the other arm and adapted to contact with a turntable and an operating member having pivotal connection with the brake lever, the pivotal points of the operating
 130

member and of the brake shoe to the brake lever lying on opposite sides of a line longitudinal to the pivoted arm of said lever.

5 An attachment of the character described, comprising a bell crank brake lever pivoted to swing on one arm, a brake shoe pivoted to the other arm and adapted to contact with a turntable, an operating member having pivotal connection with the brake
10 lever, the pivotal points of the operating member and of the brake shoe to the brake lever lying on opposite sides of a line longitudinal to the pivoted arm of said lever, and a stopping arm having frictional connection
15 with the operating member and adapted to be engaged by a tone arm.

6. An attachment of the character described, comprising a bell crank brake lever pivoted to swing on one arm, an elongated
20 concave brake shoe pivoted to the other arm and an operating member having pivotal connection with the brake lever, the pivotal points of the operating member and of the

brake shoe to the brake lever lying on opposite sides of a line longitudinal to the piv- 25
oted arm of said lever.

7. An attachment of the character described, comprising a bell crank brake lever pivoted to swing on one arm, an elongated
30 concave brake shoe pivoted to the other arm, an operating member having pivotal connection with the brake lever, the pivotal points of the operating member and of the brake shoe to the brake lever lying on opposite
35 sides of a line longitudinal to the pivoted arm of said lever, and a stopping arm having frictional connection with the operating member, and a head in the path of movement of the tone arm, whereby the
40 brake shoe is caused to engage a turntable and continued movement of the turntable will carry the shoe forward and stop rotation of the turntable by a wedging action.

In testimony whereof I affix my signature.

HARVEY HUBBELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

The first of the year was a very successful one for the school. The pupils showed a marked improvement in their work, and the teachers were very pleased with the results. The school was visited by a number of distinguished guests, and the principal gave a most interesting address. The school was also visited by a number of distinguished guests, and the principal gave a most interesting address.

THE SCHOOL YEAR

The school year was a very successful one for the school. The pupils showed a marked improvement in their work, and the teachers were very pleased with the results. The school was visited by a number of distinguished guests, and the principal gave a most interesting address. The school was also visited by a number of distinguished guests, and the principal gave a most interesting address.

The second of the year was a very successful one for the school. The pupils showed a marked improvement in their work, and the teachers were very pleased with the results. The school was visited by a number of distinguished guests, and the principal gave a most interesting address. The school was also visited by a number of distinguished guests, and the principal gave a most interesting address.

The third of the year was a very successful one for the school. The pupils showed a marked improvement in their work, and the teachers were very pleased with the results. The school was visited by a number of distinguished guests, and the principal gave a most interesting address. The school was also visited by a number of distinguished guests, and the principal gave a most interesting address.

VERTICAL FILE FOR TALKING MACHINES.

1,268,141 ----- M. Nystrom,
Filed May 31, 1917,
Patented June 4, 1918.

M. NYSTROM.
 VERTICAL FILE FOR TALKING MACHINES.
 APPLICATION FILED MAY 31, 1917.

1,268,141.

Patented June 4, 1918.

Fig. 1.

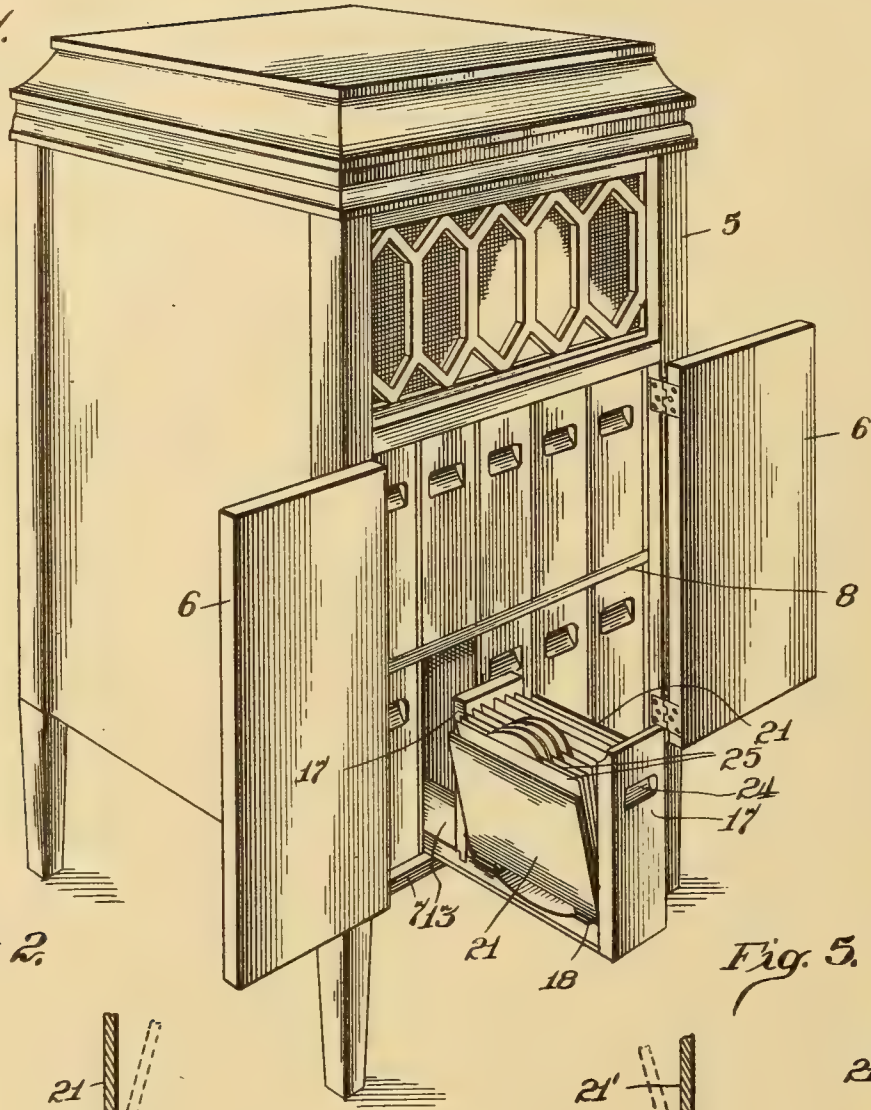


Fig. 2.

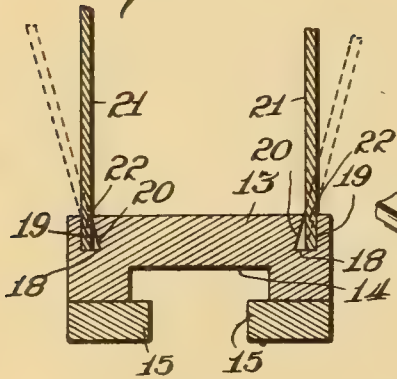


Fig. 3.

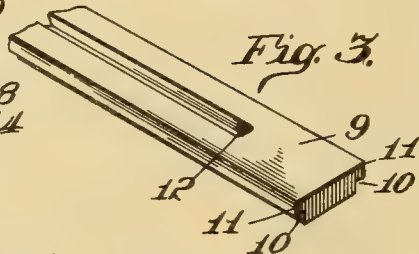


Fig. 5.

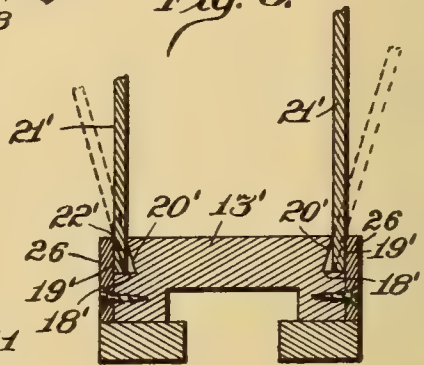
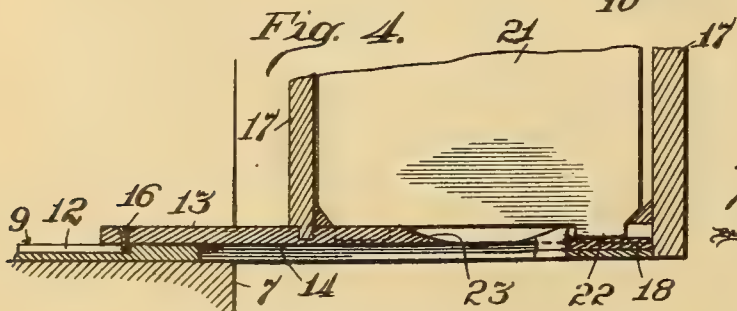


Fig. 4.



Inventor
 Martin Nystrom
 W. H. Bell
 Attorney

UNITED STATES PATENT OFFICE.

MARTIN NYSTROM, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

VERTICAL FILE FOR TALKING-MACHINES.

1,268,141.

Specification of Letters Patent.

Patented June 4, 1918.

Application filed May 31, 1917. Serial No. 171,894.

To all whom it may concern:

Be it known that I, MARTIN NYSTROM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vertical Files for Talking-Machines, of which the following is a specification.

This invention relates to talking machines and has for its object the provision of a compact, inexpensive and readily operable vertical file for talking machine records. A further object of my invention is the provision of a vertical file for records wherein the records are compactly stored when not in use and which expands to permit ready access to the records when required.

Further objects and advantages of my invention will be apparent as it is better understood by reference to the following specification when read in connection with the accompanying drawing, illustrating the preferred embodiments thereof, in which

Figure 1 is a view in perspective of a talking machine embodying my invention;

Fig. 2 is an enlarged vertical section through a portion of the file;

Fig. 3 is a view in perspective of a portion of a base on which the file is slidably mounted;

Fig. 4 is a vertical longitudinal section through a portion of the structure illustrating the file in position to permit access to the records, and

Fig. 5 is a view similar to Fig. 2, illustrating a slightly different form of my invention.

Referring to the drawing, 5 indicates a talking machine cabinet of any usual or suitable construction and provided with the usual space for storing records to which access is obtained by means of doors 6.

Upon the shelves 7 and 8 within this space I secure a plurality of fixed supports 9 having their lower edges rabbeted at 10 to provide flanges 11. Each of the supports 9 is provided with a slot 12 in its upper surface. Slidably mounted on the supports 9 are a plurality of bottom members 13 having recesses 14 in their under faces to embrace the upper portions of the supports 9. The bottom members 13 are provided with inwardly directed flanges 15 which engage beneath the flanges 11 on the supporting members 9 to maintain the parts in their

proper relative positions. Screws 16 in the inner ends of the bottom members 13 project into the slots 12 to limit outward sliding movement of the bottom members.

Front and rear end members 17 are secured to each of the bottom members 13, the end members being spaced apart a distance slightly greater than the diameter of the largest record intended to be accommodated thereby. The bottom members 13 are provided on either side adjacent the end members 17 with recesses 18, the outer walls 19 of which are vertical while the inner walls 20 slope inwardly and downwardly as indicated in Fig. 2, the recesses being wider at their bottoms than at their tops. A side wall 21 is mounted on each side of each of the bottom members 13 between the end members 17, the side walls being provided with extensions 22 adapted to be loosely disposed in the recesses 18. Each of the bottom members 13 is preferably provided on its upper face with a recess 23 conforming substantially to the contour of a record, the purpose being to prevent the records from rolling against the end members 17 when the file is moved into and out of its normal position.

Normally the files are disposed so that the doors 6 may be closed as will be readily understood by reference to Fig. 1. The side walls 21 are held in vertical position as indicated in full lines in Fig. 2, thus records is desired one of the files may be are compactly held. When access to the records is desired one of the files may be drawn outwardly as shown in Fig. 1 and for this purpose I preferably provide a finger recess 24 in the face of each of the front end members 17. When the desired file has been drawn outwardly the side walls 21 fall into the position indicated in dotted lines in Fig. 2, thus permitting the records to be separated sufficiently to allow selection thereof. Each file is preferably provided with a plurality of separators 25 between which the records are disposed.

In Fig. 5 of the drawing I have illustrated a slightly different form of my invention in which the bottom 13' is rabbeted at its edges and plates 26 are secured thereto to form recesses 18', the outer walls 19' of which are vertical while the inner walls 20' slope inwardly and downwardly as in the structure previously described. The

side walls 21' are provided with extensions 22' which, when disposed in the recesses, support the side walls so that they may assume either of the positions indicated in full and dotted lines in the drawing.

It will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing any of its material advantages, the form hereinbefore described being merely preferred embodiments thereof.

I claim:

1. A file for talking machine records comprising a fixed support, a frame slidable on said support including a bottom and end members, said bottom member having recesses and loose side walls between said end members, having extensions disposed in said recesses, said recesses being substantially equal in width to the thickness of said extensions and the inner walls of said recesses being shaped to permit said side walls to swing laterally about axes substantially coincident with their bottom edges.

2. A file for talking machine records comprising a fixed support, a frame slidable on said support including a bottom and end members, said bottom member having recesses and loose side walls between said end members having extensions disposed in said recesses, said recesses being substantially equal in width to the thickness of said extensions and the inner walls of said recesses

sloping inwardly and downwardly whereby said side walls are permitted to swing a limited distance laterally about axes substantially coincident with their lower edges.

3. A file for talking machine records comprising a frame having a bottom and end members, said bottom member having recesses adjacent its lateral edges, said recesses being wider at their bottoms than at their tops and loose side walls between said end members having extensions disposed in said recesses.

4. A file for talking machine records comprising a frame having bottom and end members, said bottom member having recesses adjacent its lateral edges, said recesses gradually increasing in width from top to bottom, and loose side walls between said end members having extensions disposed in said recesses.

5. A file for talking machine records comprising a frame having bottom and end members, said bottom member having a plurality of recesses adjacent each of its lateral edges, loose side walls having extensions at their bottom edges, said recesses being substantially equal in width at their tops to the thickness of said extensions and wider at their bottoms.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

CONTINUOUS PHONOGRAPH, KINETOGRAPH, OR THE LIKE.

1,268,472 ----- O. E. KELLUM,
Filed Mch. 16, 1914
Renewed Nov. 1, 1917,
Patented June 4, 1918.

O. E. KELLUM.

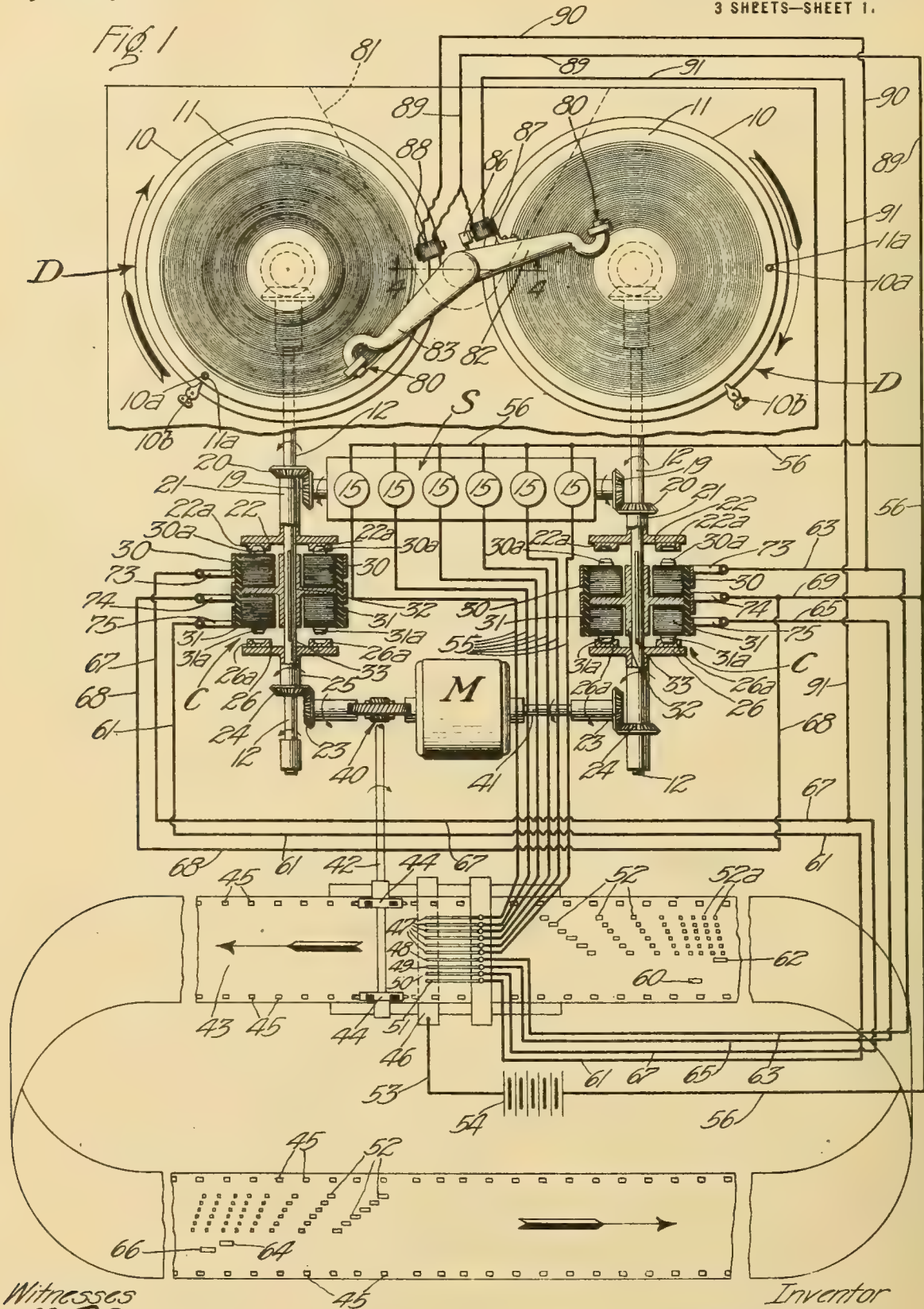
CONTINUOUS PHONOGRAPH, KINETOGRAPH, OR THE LIKE.

APPLICATION FILED MAR. 16, 1914. RENEWED NOV. 1, 1917.

1,268,472.

Patented June 4, 1918.

3 SHEETS—SHEET 1.



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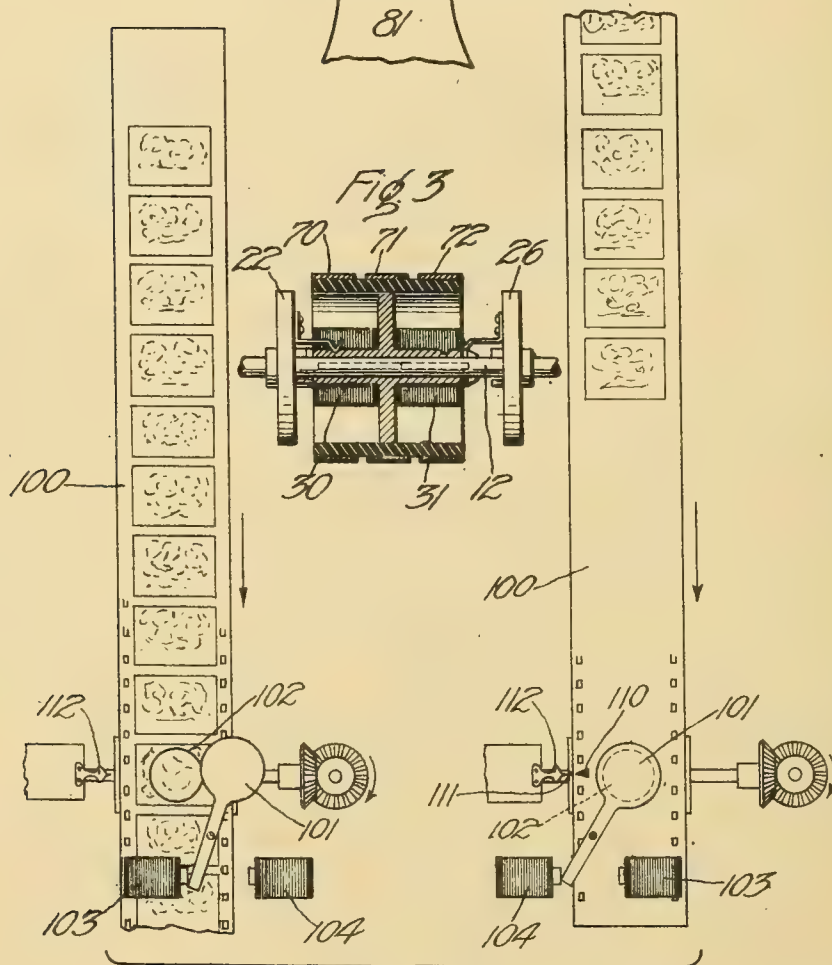
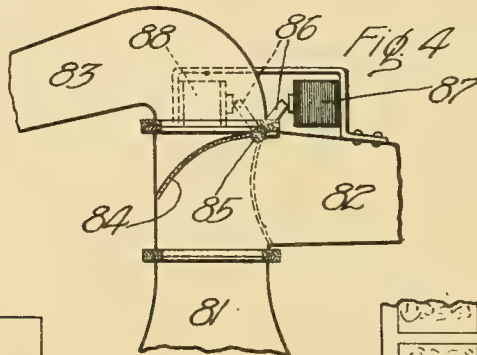
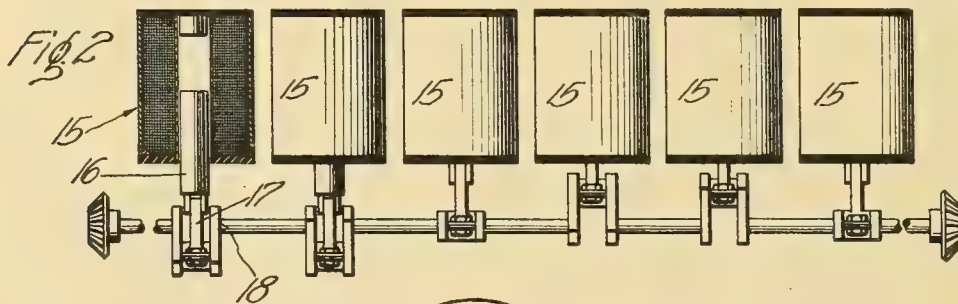
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O. E. KELLUM.
 CONTINUOUS PHONOGRAPH, KINETOGRAPH, OR THE LIKE.
 APPLICATION FILED MAR. 16, 1914. RENEWED NOV. 1, 1917.

1,268,472.

Patented June 4, 1918.

3 SHEETS—SHEET 2.



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Fig. 6.

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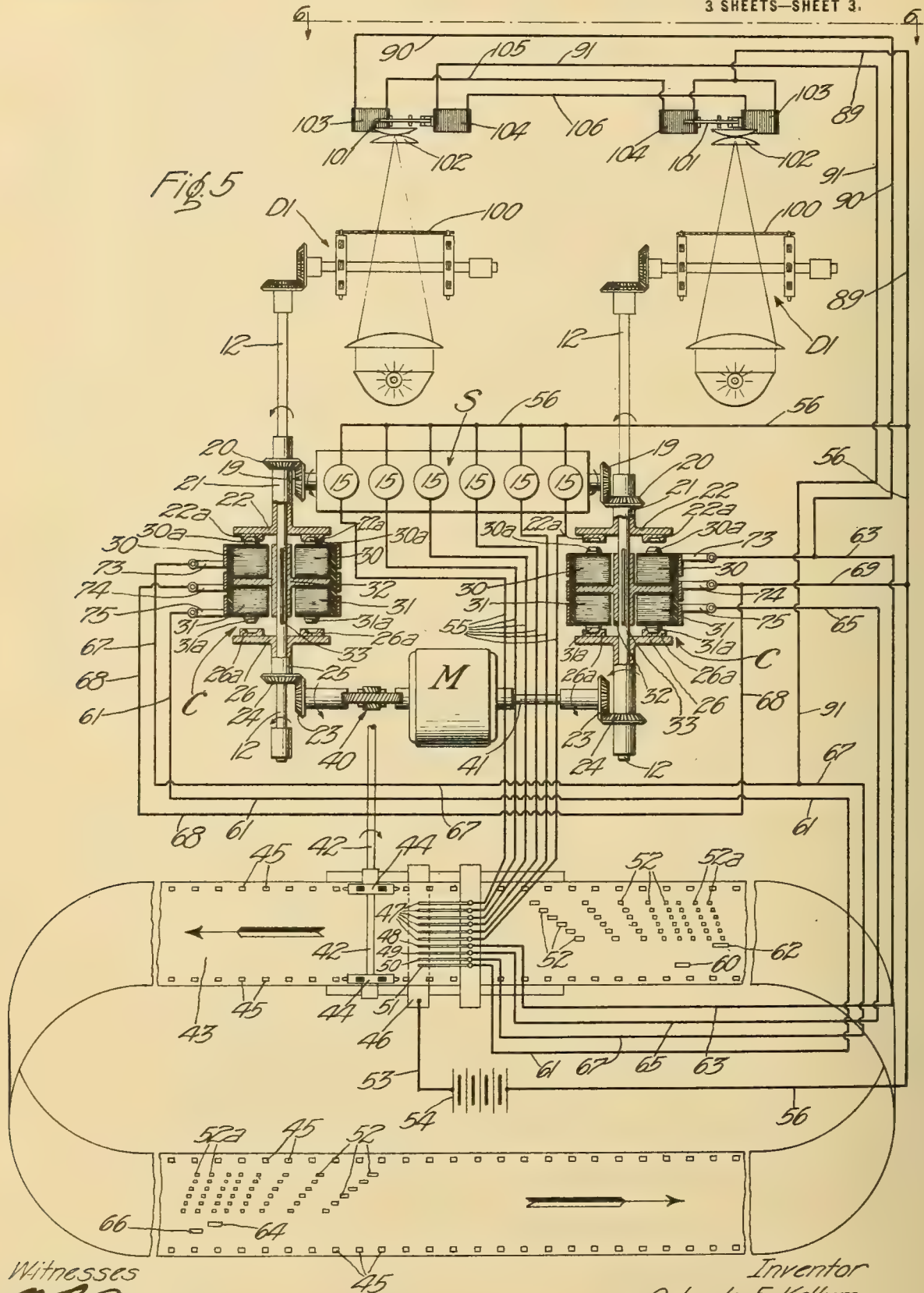
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APPLICATION FILED MAR. 16, 1914. RENEWED NOV. 1, 1917.

1,268,472.

Patented June 4, 1918.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ORLANDO E. KELLUM, OF LOS ANGELES, CALIFORNIA.

CONTINUOUS PHONOGRAPH, KINETOGRAPH, OR THE LIKE.

1,268,472.

Specification of Letters Patent.

Patented June 4, 1918.

Application filed March 16, 1914, Serial No. 824,909. Renewed November 1, 1917. Serial No. 199,773.

To all whom it may concern:

Be it known that I, ORLANDO E. KELLUM, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Continuous Phonographs, Kinetographs, or the like, of which the following is a specification.

This invention relates to the original making and reproduction of records, such as phonograph and kinetograph records, or any sound or visual or other like records; and the main object of this invention is the provision of means to make and reproduce a continuous record of indefinite length.

As is well known, the continuous performance of a kinetograph, phonograph or similar recording or reproducing machine, is limited by certain physical conditions inherent in the records themselves. Thus, the length of continuous performance of a phonograph is limited by the length of the phonograph record; and a kinetograph performance is necessarily limited by the length of one continuous film. My invention provides means for an indefinitely continuous performance by providing means for unbroken continuance from one record to a subsequent one, the end of the preceding record and the beginning of the succeeding one being so matched and so synchronized that the final effect is just as if there were only one continuous record of indefinite length.

As hereinbefore stated, my invention may be applied to any machine or device for making or for reproducing records. I herein explain my device in connection with a phonograph and with a kinetograph, but I do not limit my invention to these particular machines. I most particularly explain my invention in connection with a phonograph; this application of my invention typifying its application to other record taking and record reproducing machines.

As applied to a phonograph, my invention embodies the following described typical elements; I provide two distinct record driving devices adapted to drive separate records; and I provide a constantly running motor (of any desired character) for normally driving either one or the other of the record drivers. There is a special device for initially starting either one or the other of the record drivers and for starting the corresponding record; and this starting device (preferably in the form of a motor adapted

to be synchronously energized or controlled) is controlled so that it will bring the next record up to even speed with the record being driven by the constantly running motor at a time when the preceding record is about finished. When the starting motor has brought the succeeding record up to normal speed, then the succeeding record is connected directly with the constantly running motor and may be driven synchronously with the preceding record for a short interval. The connection between the preceding record and the constantly running motor is then broken, and the succeeding record is then driven to its end. In the meantime the attendant takes the first record off the record driver and substitutes for it another record which will succeed the second record. The third record is brought into play in the same manner that the second one was brought into play. This procedure may go on indefinitely.

When the records are originally made, they are made on a machine which is, in all essentials a duplicate of the machine on which the records are finally reproduced. The starting of the new records, in either case, is controlled by the same control mechanism. Thus, whether the records are being made or reproduced, the preceding record will be given just so many revolutions before the succeeding record is started up and is thrown into driving relation with the constantly running motor; and the arrangements are such, that once the records have been taken under the control of my device, they will always in future match and synchronize with each other under the control of my device. In fact, the only essential difference between a record making machine and a record reproducing machine, according to my invention, is the substitution of means for acting upon the record instead of means adapted to be operated by the record. When I speak of record, I speak broadly and without limitation. I do not herein limit myself to a phonographic or sound record; but by the term record I mean to designate any form of visual, auditory or other record which is made at one time of events or conditions and is reproduced at another time.

I have illustrated preferred embodiments of my invention in the accompanying drawings, in which,

Figure 1 is a diagram showing my invention as applied to a phonograph,

Fig. 2 shows a preferred form of record starting motor,

Fig. 3 shows a preferred form of connection means between the motor and the record drivers,

Fig. 4 is a section taken on line 4—4 of Fig. 1,

Fig. 5 is a diagram similar to that of Fig. 1, showing my invention applied to a kinetograph,

Fig. 6 is an elevation taken as indicated by line 6—6 of Fig. 5.

Referring now to the drawings and particularly to Figs. 1 to 4, the letter "D" may indicate a pair of independent record drivers, in this particular instance having the form of rotatable tables 10 upon which flat disk records 11 may be placed. The tables 10 may be driven from shafts 12 which are provided with certain connective or clutch mechanisms by which either of them may be connected to the constantly running motor "M" or to the starting mechanism "S". The starting mechanism "S" is preferably in the form of an electromagnetic motor capable of controlled operation; that is, capable of controlled operation by energization by successive impulses, so that the speed of operation of the motor may be accurately controlled. This starting motor "S" may be of any preferred design; I have shown a typical form in Fig. 2, being the form of motor which I use in my synchronizing apparatus shown in my Patent No. 1,027,658 dated May 28th, 1912. In essentials, this motor comprises a plurality of solenoids 15 each with a plunger 16 and connecting rod 17 connected to crank shaft 18. The cranks are arranged so that the plungers and solenoids must act successively in order to uniformly rotate the shaft 18. Successive electrical impulses to the solenoids will cause the controlled rotation of the crank shaft 18 and cause operation of the motor at any desired speed.

At each end of the crank shaft 18 there may be gears 19 meshing with gears 20 mounted on sleeves 21 which carry clutch disks 22. These sleeves 21 and clutch disks 22 are loose on the shafts 12 and are adapted to be rotatively connected with the shafts through the medium of the clutch mechanisms "C". The constantly running motor "M" (which may be of any desired character) has gears 23 meshing with gears 24 on sleeves 25 loose on the shafts 12, the sleeves 25 carrying clutch disks 26 similar to and opposing the clutch disks 22. The movable part of the clutch mechanism "C" is placed between these two clutch disks. The clutch disks may be of magnetic material; and the movable part of the clutch mechanism carries electromagnets 30 and 21 mounted upon sliding sleeve 32. The energization of magnets 30 will move the sleeve 32 toward the

disk 22 and will cause the engagement of the pole pieces 30^a in the cups 22^a, so as to make a driving engagement between the disk 22 and the shaft 12 through the sleeve 32 which is slidably keyed to the shaft 12 at 33. Energization of the magnet 31 will cause engagement of the pole pieces 31^a with the cups 26^a and make driving connection from the motor "M" through the clutch disk 26 to the shaft 12. Normally, the motor "M" is connected to and driving one of the shafts 12 and one of the record drivers "D", while the starting motor "S" is connected to the other shaft 12 ready to drive the corresponding record driver "D". The starting motor "S" is so controlled that it is started in operation at precisely the correct instant and brings up the speed of one of the records equal to the speed of the other of the records driven by the constantly running motor "M"; and when this has taken place the clutches "C" are then shifted and the new record is connected to the motor "M" and the old record is dropped.

I provide means for energizing the starting mechanism, which energizing means is operated or controlled in synchronism with the record being driven by the constantly running motor "M". I prefer to drive this energizing or control means directly from the motor "M". In the drawings, I have shown a suitable gear arrangement between the motor shaft 41 and the control shaft 42. This control shaft 42 preferably runs at a speed much lower than that of the motor, and it drives a commutator or other electrical contact mechanism which I preferably provide in the form of a perforated endless film 43 coöperating with certain brushes, as herein explained. This endless film 43 is uniformly and accurately driven in the direction indicated by the usual expedient of toothed wheels 44 on the shaft 42 engaging in perforations 45 at the edges of the film. At any given point there is a contact plate 46 arranged beneath the endless film, and a plurality of brushes 47, 48, 49, 50 and 51 above the film opposite the contact plates 46. A series of perforations 52 are adapted to pass under the contact brushes 47 and to momentarily allow these contact brushes to engage the plate 46 to complete an electrical circuit between the respective brushes and the plate. A wire 53 connects the plate 46 with one side of an electrical source 54. The brushes 47 are individually connected by wires 55 to the solenoids 15 of the starting motor, while the other sides of the solenoids are connected by wire 56 to the other side of the electrical source 54. Suppose the machine to now be operating with the parts in the positions shown and that the motor "M" is driving the right hand record 11, which is nearly finished. The left hand record 11 has been placed upon the

table 10 with a pin 10^a through an aperture 11^a in the record, so as to register the record on the table, and with both pin and aperture opposite a pointer 10^b. The arrangement is such that, when the table 10 is in this position, the starting motor "S" is in such position, that, say the left hand solenoid 15 is ready for action, its core 16 being in position to be drawn up. That is, the starting motor "S" is ready for action when the solenoids are successively energized beginning with the left hand solenoid 15. As the film 43 moves toward the left the foremost aperture 52 comes beneath that brush 47 which is connected by wire 55 to the left hand solenoid 15; and immediately thereafter, in succession, the other apertures 52 come beneath the corresponding brushes 47 so that successive impulses are sent through the wires 55 to the corresponding solenoids 15. Immediately one series of the apertures 52 has passed the brushes, the next series passes beneath them; and so on until all but the last few series, say the last two series of apertures 52, have passed beneath the brushes 47. It will be noted that these series of apertures are cut in the film so that the apertures follow each other at progressively decreasing intervals; and this means that electrical impulses are sent to the solenoids 15 at progressively decreasing intervals and that the starting motor "S" is therefore gradually brought up to normal speed. By the time all but, say, the last three series of apertures have passed the brushes 47, the starting motor "S" has been brought up to normal speed and the left hand record 11 is being driven at a speed equal to that of the right hand record 11 driven directly from the constantly running motor "M". The last two series of apertures 52^a are placed so that the starting motor "S" will be operated for a short time at its normal uniform speed after that uniform speed has once been attained. As soon as the starting motor has attained the normal speed (as soon as all but the last series of apertures 52^a have passed under the brushes 47) an aperture 60 passes beneath the brush 51 and allows the brush 51 to engage the contact plate 46, sending a current through the wire 61 to the electro-magnets 31 of the left hand clutch mechanism "C", causing the clutch mechanism to immediately throw to position to connect the shaft 12 with the constantly running motor "M". This action taken place at such a time that the pole pieces 31^a are exactly opposite the cups 26^a on the clutch disk 26. The clutch disk and the cups are constantly revolving in the direction indicated; and the commutator mechanism, including the film 43 with its perforations, etc., is so coöperated with the motor "M", and therefore with the disk 26, that the shaft 12 and the pole pieces 31^a will be revolving in the same direction at the same speed as the clutch disk 26 and the cups 26^a and the pole pieces will be exactly opposite the cups when the perforation 60 comes under the brush 51 and the electro-magnets 31 act to throw the clutch mechanism to connect the left hand record with the constantly running motor "M". When this has been done, the left hand record is driven by the constantly running motor, as is also the right hand record; and the starting motor "S" is also being driven at a speed which drives the clutch disks 22 at even speed with the shafts 12. While the starting motor is still in operation, another perforation 62 in the film 43 passes under the brush 48 and current is sent through wire 63 to the magnets 30 of the right hand clutch mechanism, causing that clutch to throw to position to disconnect the shaft 12 from the motor "M" and to connect it to the starting motor "S". The same control arrangement which provides that the clutch mechanism shall match accurately when throwing in the side connecting to the motor "M" provides for accurate matching when the clutch mechanism throws in the side connecting with the starting motor "S". That is, the starting motor "S" being in action, the cups 22^a of the right hand clutch are exactly opposite the pole pieces 30^a when the magnets 30 are energized and when the clutch shifts position. Immediately after this action has taken place, the starting motor comes to a stop, the shaft 12, at the right hand, also coming to a stop. The clutches are then in positions opposite to that illustrated in Fig. 1. The attendant then removes the right hand record 11 and replaces it with a record which is to succeed the left hand record 11, registering the pin 10^a with the pointer 10^b as before. This act of registration also moves the starting motor to its proper position for making its next start under control of the commutator mechanism. The record 11 at the left hand then rotates until it has been entirely used, when the other sets of perforations 52, 52^a, etc., come under the brushes 47. The starting motor is again operated to start the right hand record 11; and as soon as the starting motor attains its normal speed, the perforation 64 passes under the brush 49 and a current is sent through wire 65 to the magnet 31 of the right hand clutch "C", causing that clutch to return to the position shown in Fig. 1 and causing the right hand record to be directly connected to the motor "M". During the brief succeeding interval, the two records are driven together in unison by the motor "M". This is for the purpose of allowing the record which is being started to steady down to uniform and vibrationless motion before it is actually thrown into use. At the end of this short interval another perforation 66 passes be-

neath the brush 50 and a current is sent out over the wire 67 to the magnets 30 of the left hand clutch, returning that clutch to the position shown in Fig. 1. This operation of starting successive records may be kept up indefinitely. The various magnets 30 and 31 are connected by common wires 68 and 69 to the battery 54. The clutch mechanism is provided with three collector rings 70, 71 and 72 engaged by brushes 73, 74 and 75 respectively to which the wires 67, 68 and 61 connect for the left hand clutch mechanism, and to which the wires 63, 69 and 65 connect for the right hand clutch mechanism. The rings 70 are connected to one side of the magnets 30 and the rings 72 to one side of the magnets 31, while the rings 71 are connected to the opposite sides of all the magnets, forming the common connection through which all the magnets are connected to the battery 54.

I have shown, in coöperation with the records 11, suitable mechanisms 80, which mechanisms may be either for the purpose of originally making the records or for reproducing them. These mechanisms may connect to a suitable horn 81, or other sound transmitter, through the medium of two tubes or sound arms 82 and 83. I have provided means by which either one or the other of mechanisms 80 may be cut off from connection with the horn 81. A shutter or valve 84 is mounted upon a pivot 85 carrying an armature 86, and this armature may be of sufficient weight to over-balance the valve 84 and to hold it either in the position shown in full lines or the position shown in dotted lines in Fig. 4. A pair of magnets 87 and 88 operate upon the armature 86 to throw it and the valve from one position to another. Energization of the magnets 87 will cause the sound arm 83 to be shut off from connection with the horn 81, while energization of the magnet 88 will cause the sound arm 82 to be shut off from connection with the horn 81. One side of each of the magnets is connected to a common wire 89 leading to the battery wire 56; the other sides of the magnets are connected to wires 90 and 91 connecting to wires 63 and 67 respectively. The wires 63 and 67 are the ones which form a part of the circuit for energizing the magnets 30 of the two clutches "C." Whenever the magnets 30 are energized to disconnect either of the record drivers from the motor "M," then the corresponding magnet 87 or 88 is energized to throw the valve 84 to disconnect the corresponding arm 82 or 83 from the horn 81, and to thus disconnect the corresponding mechanism 80 from the horn. At the same time, the mechanism 80 for the other record (the record which has just been started in operation) will be simultaneously thrown into action.

Suppose now that a record is being made on my machine and suppose that the original sound of, say, an opera, is being produced in front of the horn 81, or is being produced in any manner in connection with the horn or equivalent. Suppose also that the mechanism is in the position shown in Fig. 1, and that the right hand record has been placed upon the right hand driver and registered, as stated, and the right hand mechanism 80 has been placed in proper co-operation with the record. As the right hand record is rotated, the mechanism 80 will record upon it the sound being originally produced through the horn. As the right hand record reaches its end, the control mechanism, including the film 43, reaches the position shown in Fig. 1 and the new record which has been placed upon the left hand driver is started in operation. The starting motor brings the new record up to speed and the left hand clutch is then thrown to connect the new record to the motor "M." Immediately thereafter, the first record is disconnected from the motor "M" and simultaneously the valve 84 is shifted so as to throw the sound into the left hand mechanism 80 which immediately begins recording it. It will be noted that recording does not begin upon the succeeding record until that record has been fully connected to the motor "M" and has had a short interval to steady down to uniform and vibrationless rotation. The attendant removes the first record and places on the right hand driver another blank record. The left hand record rotates through a certain pre-determined number of revolutions when the control mechanism starts the third record and shifts the operation to that record at the instant of finishing the second record. This may take place indefinitely.

In reproducing a series of records, made as above described, there is no difference whatever in the mechanism of my invention, except that the mechanism 80 becomes a reproducer instead of a recorder. The attendant places the first record upon either one or the other of the record drivers and registers it, as hereinbefore stated, and places the needle of the reproducer in the outermost groove of the record. The machine then acts to rotate the record and to change to the succeeding record in exactly the same manner as it before acted in making the original records; so that, upon reproduction, the records must necessarily match and there can be no break or discrepancy between them. In practice, I propose to make a standard control mechanism; that is, I propose to make the film, or equivalent, of standard design and dimensions and to make and reproduce all of the records under the control of this one standard control mechanism. With this arrangement, I am

enabled to take continuous records at any place and to send those records to other places where they may be reproduced under the control of my machine with its standard control mechanism. Hence, records taken under the control of my mechanism can always be reproduced accurately and without interruption on any of my machines at any time and place.

In Figs. 5 and 6 I show my invention as applied to a kinteograph. I show two driving mechanisms D¹ taking the place of the two drivers "D" of the form shown in Fig. 1. The driving mechanisms D¹ are driven from the shafts 12 and may include any suitable means for driving a motion picture film 100. In the drawings, I have shown a simple arrangement; any of the arrangements now in vogue for intermittently moving the film may be used. I have shown a shutter 101 adapted to cut off the light rays to or from the objective lenses 102, these shutters being operated by magnets 103 and 104. Energization of either of the magnets 104 will cause the corresponding shutter to assume the position before the objective 102; while energization of either of the magnets 103 will cause the shutter to be retracted from this position. The wire 90, hereinbefore described, connects to the magnet 103 of the left hand mechanism in Fig. 5, while the wire 91 connects to the magnet 104 of the same mechanism, while the magnet 103 of the left hand mechanism is connected by wire 105 with magnet 104 of the right hand mechanism, and magnet 104 of the left hand mechanism is connected by wire 106 with magnet 103 of the right hand mechanism. The other sides of both magnets 103 and 104 of the right hand mechanism are connected to the common wire 89. Current sent through the wire 90 (which occurs when the right hand film 100 is being finished and when the left hand film is brought into play) will energize the left hand magnet 103 and right hand magnet 104 (in Fig. 5) which will throw the shutters to the position shown in Fig. 6. Current sent through the wire 91 will cause movement of the shutters oppositely. To all intents and purposes, this shutter mechanism operates similarly to the valve mechanism shown in Fig. 4, the effect of this shutter mechanism being to throw the shutter over the lens of the film just being finished and to open the shutter over the lens of the film just being started.

When my device is put in action in connection with a kinetograph, the film 100 is placed with a certain mark 110 opposite a suitable mark 111 on the apparatus which drives the film and both marks are placed opposite a pointer 112 mounted on some stationary part of the apparatus. The control mechanism causes the first film to be fed

through a machine; and after a certain definite length of film has been passed through the machine the control mechanism will then start the operation of the starting motor to start the next film. Thus, as shown in Fig. 6, the left hand film is nearing its end and the right hand film is just ready to start. (in Fig. 5 it is the right and left films that are finishing and starting, respectively). The starting motor will start the right hand film and the corresponding driver mechanism will be thrown into driving relation with the constantly running motor "M" and the connection of the motor "M" to the left hand film will then be broken. Just as this action takes place, the last picture on the left hand film (in Fig. 6) will be passing the lens and the first picture on the right hand film will be just ready to pass. The first picture on the right hand film will be a continuation of the last picture on the left hand, just as closely as two pictures on the same film are continuations of each other. When the left hand film is finished, the attendant places the third film, as hereinbefore described, and it is thrown into action, as soon as the second film has been finished.

It will be seen that the gist of my invention is contained in the provision of a pair of record drivers, and a constantly running motor, and means for connecting the motor with either of the drivers, and a means operated synchronously with, or in control by, the record being driven by the motor or the motor itself, for throwing a new record into action. The particular modes of action and the specific constructions of the various parts do not enter into the broad conception of my invention; they may be varied to suit conditions.

Having described my invention, I claim—

1. In combination, a pair of independent record driving means, a constantly running motor, a record starting motor, means operated in synchronism with a record being driven by the constantly running motor to energize the starting motor, and means for connecting the starting motor with either record driving means and for connecting the constantly running motor with either record driving means.

2. In combination, a pair of independent record driving means, a constantly running motor, means for connecting the motor to either driving means, a record starting device and means for energizing the same in synchronism with a record being driven by the constantly running motor, and means to connect the record starting device to either of the record driving means.

3. In combination, a pair of independent record driving means, a constantly running motor adapted to drive either record driving means, a record starting device, means

for energizing the starting device to bring one of the record drivers up to normal speed even with the other record driver driven by the constantly running motor, and
 5 means for connecting the constantly running motor to said record driver after it has attained normal speed.

4. In combination, a pair of independent record driving means, a constantly running
 10 motor adapted to drive either record driving means, a record starting device, means for energizing the starting device to bring one of the record drivers up to normal speed even with the other record driver driven by
 15 the constantly running motor, means for connecting the constantly running motor to said record driver after it has attained normal speed and for disconnecting the starting device from said record driver, and
 20 means for immediately thereafter connecting the starting device with the other record driver while the starting device is energized.

5. In combination, a pair of independent record drivers, a constantly running motor,
 25 a record starting mechanism, means for connecting either the constantly running motor or the starting mechanism with either of the record drivers, and energizing means for the starting mechanism controlled by the constantly
 30 running motor.

6. In combination, a pair of independent record drivers, a constantly running motor, a record starting mechanism including an electro-magnetic motor, means for connect-
 35 ing either the constantly running motor or the starting mechanism with either of the record drivers, and energizing means for the starting mechanism controlled by the constantly running motor.

40 7. In combination, a pair of independent record drivers, a constantly running motor, a record starting mechanism, means for connecting either the constantly running motor or the starting mechanism with either of the
 45 record drivers, and means controlled by the constantly running motor to energize the starting mechanism and to operate said connecting means.

8. In combination, a pair of independent
 50 record drivers, a constantly running motor, a record starting electro-magnetic motor, means for connecting either the constantly running motor or the starting motor with either of the record drivers, and electrical
 55 means controlled by the constantly running motor to energize the record starting motor and to operate said connecting means.

9. In combination, a pair of independent record drivers, a constantly running motor,
 60 a record starting mechanism including an electric-magnetic motor, means for connecting either the constantly running motor or the starting motor with either of the record drivers, and energizing means for the start-
 65 ing mechanism controlled by the constantly

running motor, said energizing means including means operated by the constantly running motor for intermittently supplying current to said starting motor.

10. In combination, a pair of independent
 70 record driving means, a constantly running motor, a record starting motor, means for connecting either the starting motor or the constantly running motor with either of the record drivers, and an energizing means for
 75 the starting motor adapted to give impulses to the starting motor at progressively decreasing intervals to gradually bring the speed of the starting motor up to the speed of a record being driven by the constantly
 80 running motor.

11. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting
 85 motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either of the record drivers, and energizing means
 90 for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting
 95 motor will be brought up to speed equal to that of a record being driven by the constantly running motor.

12. In combination, a pair of independent record driving means, a constantly running
 100 motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either
 105 of the record drivers, and energizing means for the starting motor including commutator means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually
 110 increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor.

13. In combination, a pair of independent record driving means, a constantly running
 115 motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either
 120 of the record drivers, energizing means for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its
 125 speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, and electro-magnetic means for operating said connection means
 130

for making and breaking driving connection between the two motors and the two record drivers.

14. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, electro-magnetic means for operating said connection means for making and breaking driving connection between the two motors and the two record drivers, and means cooperating with said starting motor energizing means for controlling said electro-magnetic means.

15. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including commutator means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, electro-magnetic means for operating said connecting means for the purpose of making and breaking driving connection between the two motors and the two record drivers, and commutator means cooperating with the commutator means of said starting motor control for controlling the operation of said electro-magnetic means.

16. In combination, a pair of independent record driving means, a constantly running motor, a record starting motor, means operated in synchronism with a record being driven by the constantly running motor to energize the starting motor, and means for connecting the starting motor with either record driving means and for connecting the constantly running motor with either record driving means, a mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

17. In combination, a pair of independent

record driving means, a constantly running motor, means for connecting the motor to either driving means, a record starting device and means for energizing the same in synchronism with a record being driven by the constantly running motor, means to connect the record starting device to either of the record driving means, a mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

18. In combination, a pair of independent record drivers, a constantly running motor adapted to drive either a record driver, a record starting device, means for energizing the starting device to bring one of the record drivers up to normal speed even with the other record driver being driven by the constantly running motor, means for connecting the constantly running motor to said record driver after it has attained normal speed, mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

19. In combination, a pair of independent record drivers, a constantly running motor, a record starting mechanism, means for connecting either the constantly running motor or the starting mechanism with either of the record drivers, energizing means for the starting mechanism controlled by the constantly running motor, a mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

20. In combination, a pair of independent record drivers, a constantly running motor, a record starting mechanism including an electro-magnetic motor, means for connecting either the constantly running motor or the starting mechanism with either of the record drivers, an energizing means for the starting mechanism controlled by the constantly running motor, a mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

21. In combination, a pair of independent record drivers, a constantly running motor, a record starting mechanism including an electro-magnetic motor, means for connecting either the constantly running motor or the starting mechanism with either of the record drivers, an energizing means for the starting mechanism controlled by the constantly running motor, said ener-

gizing means including means operated by the constantly running motor for intermittently supplying current to said starting motor, a mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

22. In combination, a pair of independent record driving means, a constantly running motor, a record starting motor, means for connecting either the starting motor or the constantly running motor with either of the record drivers, an energizing means for the starting motor adapted to give impulses to the starting motor at progressively decreasing intervals to gradually bring the speed of the starting motor up to the speed of the record being driven by the constantly running motor, a mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

23. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, a mechanism adapted to cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

24. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including commutator means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, a

mechanism adapted to cooperate with a record on each of the driving means, and electro-magnetic means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

25. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, electro-magnetic means cooperating with said energizing means for operating said connection means for making and breaking driving connection between the two motors and the two record drivers, a mechanism adapted to cooperate with a record on each of the driving means, and electro-magnetic means cooperating with said electro-magnetic connection operating means for making said mechanism effective or ineffective with respect to either record.

26. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, electro-magnetic means for operating said connection means for making and breaking driving connection between the two motors and the two record drivers, and means cooperating with said starting motor energizing means for controlling said electro-magnetic connection operating means, a mechanism adapted to cooperate with a record on each of the driving means, and electro-magnetic means cooperating with said electro-magnetic connection operating means for making said mechanism effective or ineffective with respect to either record.

27. In combination, a pair of independent record driving means, a constantly running

motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting motor
 5 or the constantly running motor with either of the record drivers, energizing means for the starting motor including commutator means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor,
 15 electro-magnetic means for operating said connecting means for the purpose of making and breaking driving connection between the two motors and the two record drivers, commutator means cooperating
 20 with said starting motor energizing commutator means for controlling the operation of said electro-magnetic means, a mechanism adapted to cooperate with a record on each of the driving means, and electro-magnetic means cooperating with said electro-magnetic connection operating means for making said mechanism effective or ineffective with respect to either record.

28. In combination, a pair of independent
 30 record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means for connecting either the starting
 35 motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to speed equal to that of a record being driven by the constantly running motor, a
 45 mechanism adapted to cooperate with a record on each of the driving means, and electro-magnetic means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

29. In combination, a pair of independent record driving means, a constantly running motor, an electro-magnetic record starting motor capable of being controllably operated by successive electrical impulses, means
 55 for connecting either the starting motor or the constantly running motor with either of the record drivers, energizing means for the starting motor including means for intermittently and at progressively decreasing intervals supplying current to said starting motor so as to gradually increase its speed so that a record driven by the starting motor will be brought up to the speed

equal to that of a record being driven by the
 65 constantly running motor, electro-magnetic means for operating said connection means for making and breaking driving connection between the two motors and the two record
 70 drivers, a mechanism adapted to cooperate with a record on each of the driving means, and electro-magnetic means cooperating with said electro-magnetic connection operating means for making said mechanism effective or ineffective with respect to either
 75 record.

30. In combination, a pair of record driving means, a constantly running motor, a record starting motor, means operated in synchronism with a record being driven to
 80 energize the starting motor, and means for connecting the starting motor with either record driving means and for connecting the constantly running motor with either record driving means, a mechanism adapted to
 85 cooperate with a record on each of the driving means, and means cooperating with the starting motor energizing means for making said mechanism effective or ineffective with respect to either record.

31. In combination, a pair of record drivers, a constantly running motor, a starting motor, two two-position clutches in connection one with each record driver and each adapted in one position to connect the
 95 corresponding record driver to the constantly running motor and in the other position to connect the corresponding record driver to the starting motor, said clutches being normally one in one of said positions
 100 and the other in the other of said positions, means for energizing said starting motor to start one of the record drivers, and means for throwing both clutches, after the starting operation of said starting motor.

32. In combination, a pair of record drivers, a constantly running motor, releasable driving connections between the motor and each of the record drivers, a starting motor, releasable driving connections
 110 between the starting motor and each of the record drivers, means for energizing the starting motor in synchronism with a record driver driven by the constantly running motor, and means cooperating with said energizing means to throw said driving connections to connect to the constantly running motor the record driver started by the starting motor and to disconnect the other record driver from the constantly running
 120 motor.

33. In combination, a pair of record drivers, a constantly running motor, driving connections between the motor and each of the record drivers, a starting mechanism,
 125 driving connections between the starting mechanism and each of the record drivers, means for energizing the starting mecha-

nism, and means for throwing the said driving connections to connect to the motor the record driver started by the starting mechanism and to disconnect the other record driver from the motor.

34. In combination, a pair of record drivers, a constantly running motor, an electro-magnetic starting motor, means to connect either the constantly running motor or the starting motor to either of the record drivers, electro-magnetic means for operating said connecting means, a commutator mechanism driven by the constantly running motor, and electrical circuits cooperating the commutator mechanism with the starting motor and the electro-magnetic operating means.

35. In combination, a plurality of independent record drivers, a driving motor connected to one of the record drivers, a starting driving mechanism connected to another of the record drivers, and means whereby said starting mechanism is energized to drive said last mentioned record driver in synchronism with the record driver connected to the driving motor.

36. In combination, a plurality of independent record drivers, a driving motor adapted to drive any one of the record drivers, a starting driving mechanism adapted to drive another of the record drivers, and means whereby said starting mechanism is energized to drive said last mentioned record driver in synchronism with the record driver driven by said driving motor.

37. In combination, a plurality of independent record drivers, motor means for driving any one of said drivers, motor means for starting another of said record drivers,

and means controlled by said first mentioned motor means for causing operation of said second mentioned motor means in synchronism therewith.

38. In combination, a plurality of record drivers, a constantly running motor, means whereby said motor may cause the operation of any one of said record drivers, and means controlled by said constantly running motor for causing the starting of another of said record drivers and for then causing its operation synchronously with the first mentioned record driver independently of the constantly running motor.

39. In combination, a plurality of record drivers, a constantly running motor, means whereby said motor may drive any one of said record drivers, and means operated by said constantly running motor for positively starting another of said record drivers and for then driving it synchronously with the first mentioned record driver independently of the constantly running motor.

40. In combination, a pair of record drivers, a constantly running motor, means whereby said motor may drive either of said record drivers, and means operated by said constantly running motor for positively starting the other of said record drivers and for then driving it synchronously with the first mentioned record driver independently of the constantly running motor.

In witness that I claim the foregoing I have hereunto subscribed my name this 5th day of March, 1914.

ORLANDO E. KELLUM.

Witnesses:

JAMES T. BARKELEW,
DRUE L. HOFFMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

COMBINATION MOTION PICTURE AND SOUND REPRODUCING
MECHANISM.

1,268,729 ----- A. L. Kirkwood,
Filed Apr. 11, 1916,
Patented June 4, 1918.

A. L. KIRKWOOD.
COMBINATION MOTION PICTURE AND SOUND REPRODUCING MECHANISM.
APPLICATION FILED APR. 11, 1916.

1,268,729.

Patented June 4, 1918.

3 SHEETS—SHEET 1.

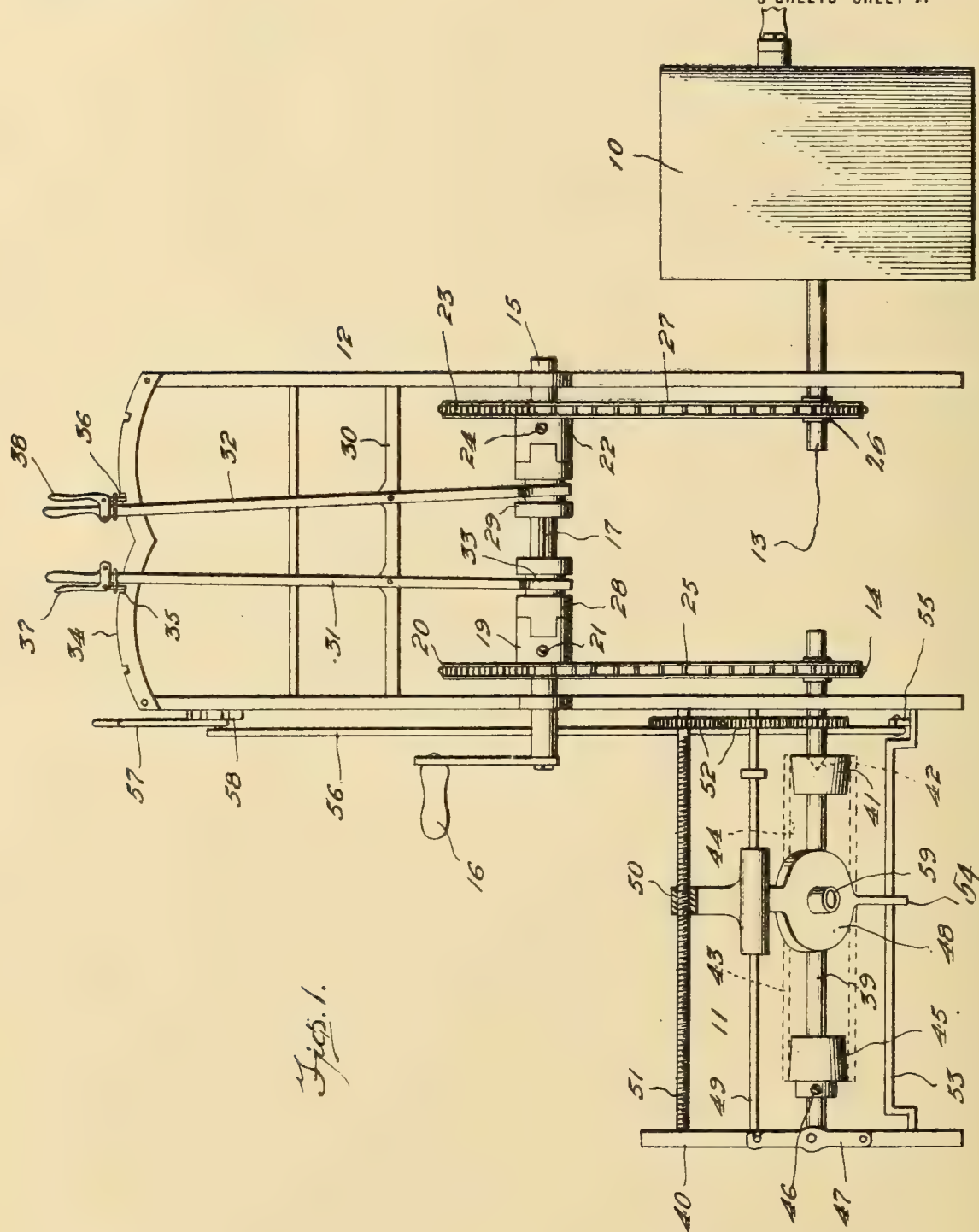


Fig. 1.

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Witnesses

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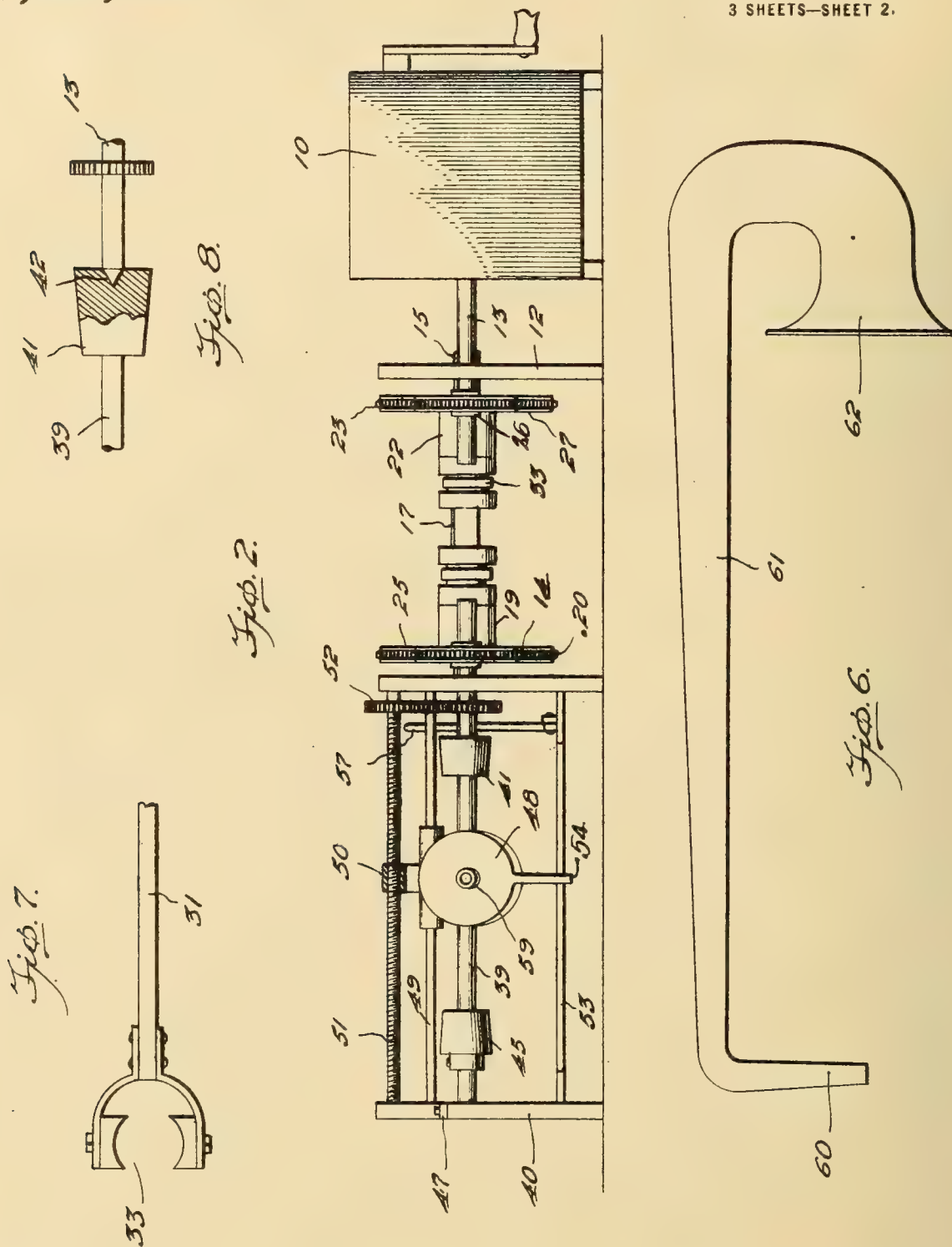
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3 SHEETS—SHEET 2.



Witnesses

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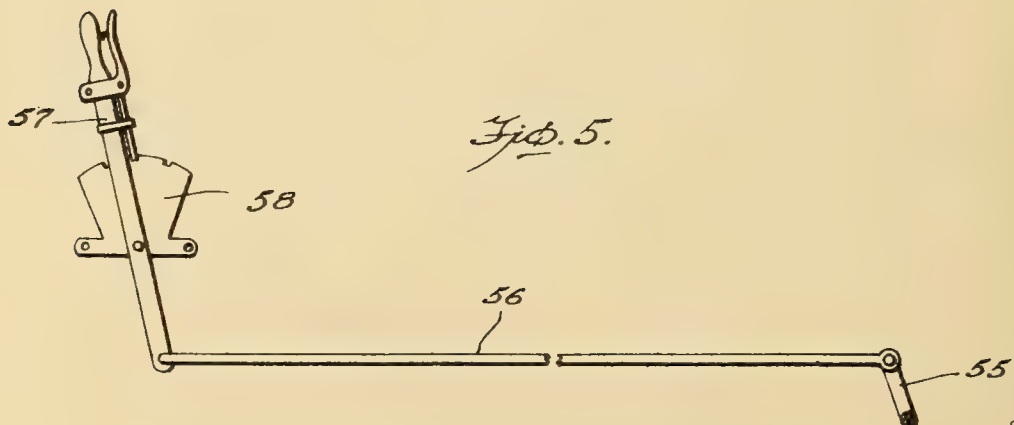
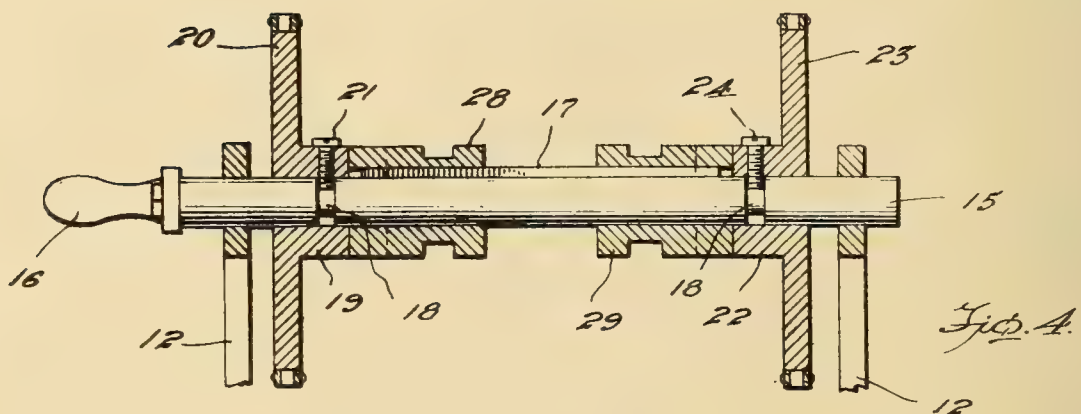
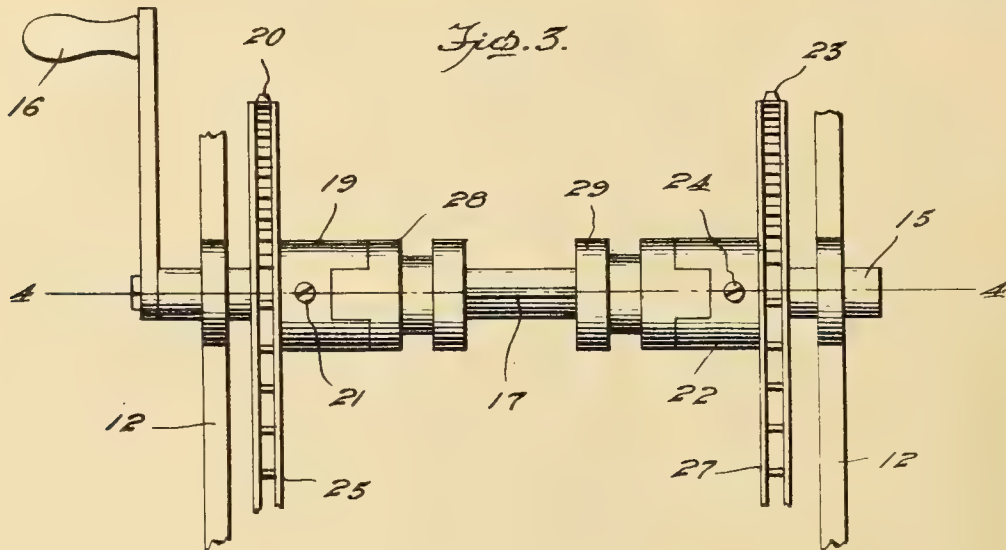
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APPLICATION FILED APR. 11, 1916.

1,268,729.

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ABRAHAM L. KIRKWOOD, OF BLOCKER, TEXAS.

COMBINATION MOTION-PICTURE AND SOUND-REPRODUCING MECHANISM.

1,268,729.

Specification of Letters Patent.

Patented June 4, 1918.

Application filed April 11, 1916. Serial No. 90,382.

To all whom it may concern:

Be it known that I, ABRAHAM L. KIRKWOOD, a citizen of the United States, residing at Blocker, in the county of Harrison and State of Texas, have invented certain new and useful Improvements in Combination Motion-Picture and Sound-Reproducing Mechanisms, of which the following is a specification.

10 This invention relates to improvements in motion picture and sound reproducing mechanisms, one object of the invention being the provision of a connecting mechanism between the two that will operate them in
15 consonance, but should either get out of step, there is provided manually operable means for halting one until the other has caught up.

20 A further object of the present invention is the provision of a driving mechanism for connection to a motion picture projector and a sound reproducing machine, the same being provided with selectively controlled clutches whereby either machine may be
25 cut out to permit the other to catch up, and thus maintain synchronous action between such machines.

30 A still further object of the present invention is the provision of a simple mechanism that can be interposed between a motion picture projector and a sound reproducing machine, so that both can be operated to synchronously project the scenes and reproduce sound.

35 With the foregoing and other objects in view and which will be apparent as the description proceeds, the invention resides in the peculiar arrangement and combination of parts hereinafter set forth, the invention being limited in scope only by what
40 is claimed.

In the accompanying drawings:

45 Figure 1 is a top plan view of a motion picture projector and a sound reproducing mechanism connected by the operating mechanism.

Fig. 2 is a front elevation of the same.

50 Fig. 3 is an enlarged plan view of the connecting mechanism between the motion picture projector and sound reproducing machine.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is a detail view of the sound box elevating mechanism.

55 Fig. 6 is a plan view of a sound duct.

Figs. 7 and 8 are detail views of various parts of the connecting mechanism.

Referring to the drawings, the numeral 10 designates the motion picture projector, which may be taken indicative of any construction of projector now in use, while 11 designates a sound reproducing machine, here shown as a cylinder type, although it is to be understood that a disk machine
65 may be employed.

Mounted between the two machines is a frame 12, which has journaled therein the shaft 39, carrying a sprocket 14, these being the driving connections for the machine 11. Journaled in the frame 12 is a shaft 15, which is here shown as being driven by a hand crank 16, although it is to be understood that a motor may also be employed, where found desirable. This shaft is provided with a longitudinal key 17 and the
75 two reduced portions 18, the sleeve 19 carrying the large sprocket 20, through the screw pin 21 being connected for free rotation upon the shaft 15 but held from longitudinal movement, while the sleeve 22 carrying the large sprocket 23, through the screw pin 24 engages the remaining recess or reduced portion 18 in a similar manner. The sprocket 20 is connected to the sprocket 14 by a chain 25, while the sprocket 23 is
85 connected to the drive sprocket 26 of the projector 10 by means of the chain 27.

Each sleeve 19 and 22 constitutes a clutch member, for coöperation with the respective spool clutch members 28 and 29, which are
90 carried upon the shaft 15 and are made to rotate therewith by means of the key 17. Thus when both clutches are connected, and the shaft 15 is rotated both machines 10 and 11 are operated in unison.

95 The two clutches are provided in order that should the machines 10 and 11 get out of step, the machine that is ahead, may be temporarily disconnected through its clutch, until the other machine has caught up, at which time the clutch could be thrown in and thus both machines be again operated in synchronism.

In order that the two clutches may be manually controlled, there is mounted in
105 the frame, a bar 30, to which is pivoted both operating levers 31 and 32, the forked ends 33 thereof fitting upon the spool clutch members 28 and 29. Carried by the frame is the double segment 34, for coöperation
110

with the detents 35 and 36, carried at the handle ends of the two respective levers. The spring actuated trigger lever 37 or 38 is mounted upon its respective handle and controls its detent or bolt. Thus the clutch members 28 and 29 may be engaged or disengaged, and be locked in either position.

The sound reproducing machine here illustrated, is provided with the shaft 39, and fixed upon said shaft with the frame 40, is a cone 41, having the lug point 42, so that a cylinder record 43 provided with a recess 44 may be properly positioned, the other cone 45, being adjustably mounted through the medium of the screw 46, so that various lengths of records may be accommodated. The pivoted bearing member 47, permits the removal of the cone 45, when introducing or removing a record. The sound box 48 is mounted upon the guide rod 49 for sliding and swinging movements, and has its feed screw engaging member 50 disposed for engagement or disengagement with the feed screw 51, which is operated through the train of gears 52 from the shaft 39.

In order that the sound box may be elevated to disengage the record and also the feed screw when returning it or inserting a new record, the crank shaft 53 has its respective ends journaled in the main frame and in the frame of the sound reproducing machine so that its crank portion is operably connected to the finger 54 of the sound box. A pin 55 projects from the shaft 53, and in turn is connected through the long rod 56 to the operating hand lever 57. This lever is in ready access to the operator, so that the lever may be operated, and through the pawl and segment 58 lock the sound box in either position.

The sound box for this purpose is to be larger, and to its sound duct 59, is detachably connected the hook end 60 of the sound amplifying horn 61, whose enlarged end 62 is bent to convey the sound in the desired direction.

From the foregoing description it will be noted that all of the operating levers are in ready access to the operator, and that by this mechanism the motion picture projector and sound reproducing machine may be operated in synchronism.

Where desirable, the shaft 13 may be extended to operate two instead of one sound reproducer mechanism or in fact any sound making device.

What I claim, as new, is:—

1. The combination with the operating shaft of a motion picture projector and the operating shaft of a sound reproducing machine, of a main frame having the operating shafts journaled therein, a main drive shaft journaled in the main frame, sprocket wheels loosely mounted on the main drive

shaft, stationary clutch members carried by the sprocket wheels, other sprocket wheels on the operating shafts, chains operating about the sprocket wheels for transmitting motion from the main drive shaft to the motion picture projector and to the sound reproducing machine, movable clutch members slidably mounted on the main drive shaft and arranged to engage the corresponding stationary clutch members, levers pivotally mounted on the main frame and having their yoked ends operatively arranged about the movable clutch members whereby both of the machines may be operated in unison or independently of each other, pivotally mounted pawls operatively mounted on the handle ends of the lever and engageable with the frame whereby to consequently hold the movable clutch members in a set position, and means for rotating the main drive shaft.

2. The combination with a motion picture projector and a sound reproducing machine, a main frame, a main driving shaft journaled in the frame, independent transmission mechanisms between the main driving shaft and the motion picture projector and the sound reproducing machine, selectively operable clutches on the main driving shaft, levers operably connected to the clutches and positioned near one end of the main frame whereby both the sound reproducing machine and the motion picture projector may be operated in unison or independently of each other, a crank shaft rockably mounted with respect to the main frame and operably connected to the sound box of the sound reproducing machine, a pin projecting from the rockably mounted shaft, a rod connected at one end of the pin, another lever pivotally mounted on the main frame near the aforementioned levers and connected to the other end of the rod whereby the sound box may be disengaged preparatory to the actuation of the lever for disconnecting the sound reproducing machine from the main shaft so that the sound reproducing machine will be stopped without loss of any part of the record thereof.

3. The combination with the operating shaft of a motion picture projector, and a sound reproducing machine including a frame, and operating shaft journaled therein, a record cylinder engageable with the operating shaft, a sound reproducer pivotally and slidably mounted on the frame and engageable with the record cylinder, another shaft operably connected to the operating shaft of the sound reproducing machine and having the sound reproducer operably connected thereto, of a main supporting frame having the operating shafts of the respective machines journaled therein, a main driving shaft journaled in the main frame, independent transmission mechanisms between

the main driving shaft and the operating shafts to the respective machines, selectively operating clutches on the main driving shaft, levers pivotally mounted near one end of the
5 main frame and connected to the clutches whereby both machines may be operated in unison or independently of each other, a rockably mounted crank shaft in the main frame and in the frame of the sound re-
10 producing machine and connected to the sound reproducer, another lever mounted on the main frame near the first mentioned levers and connected to the rockably mounted shaft so as to disengage the sound re-
producer preparatory to the actuation of 15 the lever for disconnecting the sound reproducing machine from the main driving shaft to consequently stop the sound reproducing machine without loss of any part of the record cylinder. 20

In testimony whereof I affix my signature.

ABRAHAM L. KIRKWOOD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



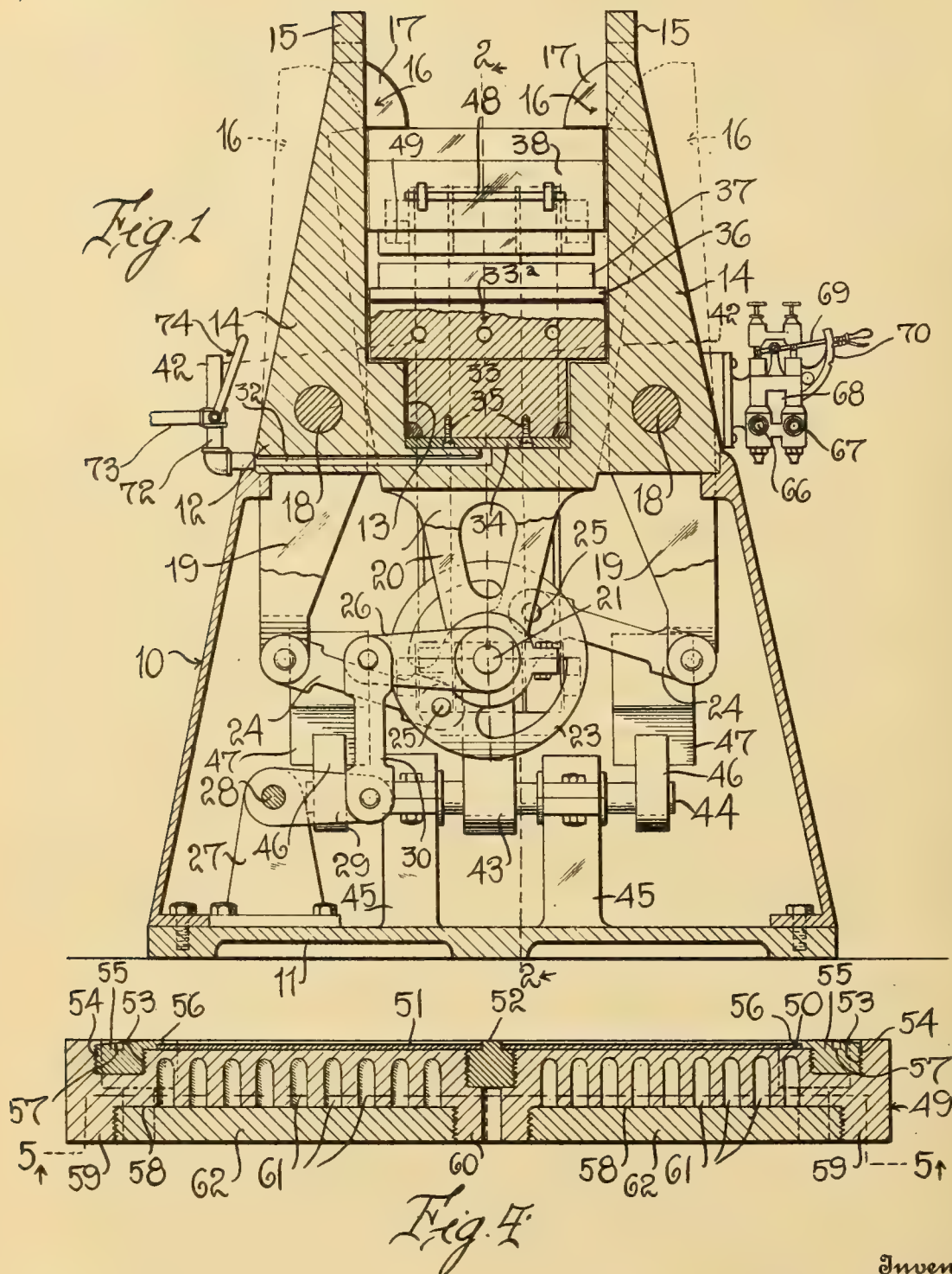
HAND CONTROLLED HYDRAULIC PRESS.

1,269,060 ----- G. E. Davenport,
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Patented June 11, 1918.

G. E. DAVENPORT.
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3 SHEETS—SHEET 1.



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1,269,060.

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3 SHEETS—SHEET 2.

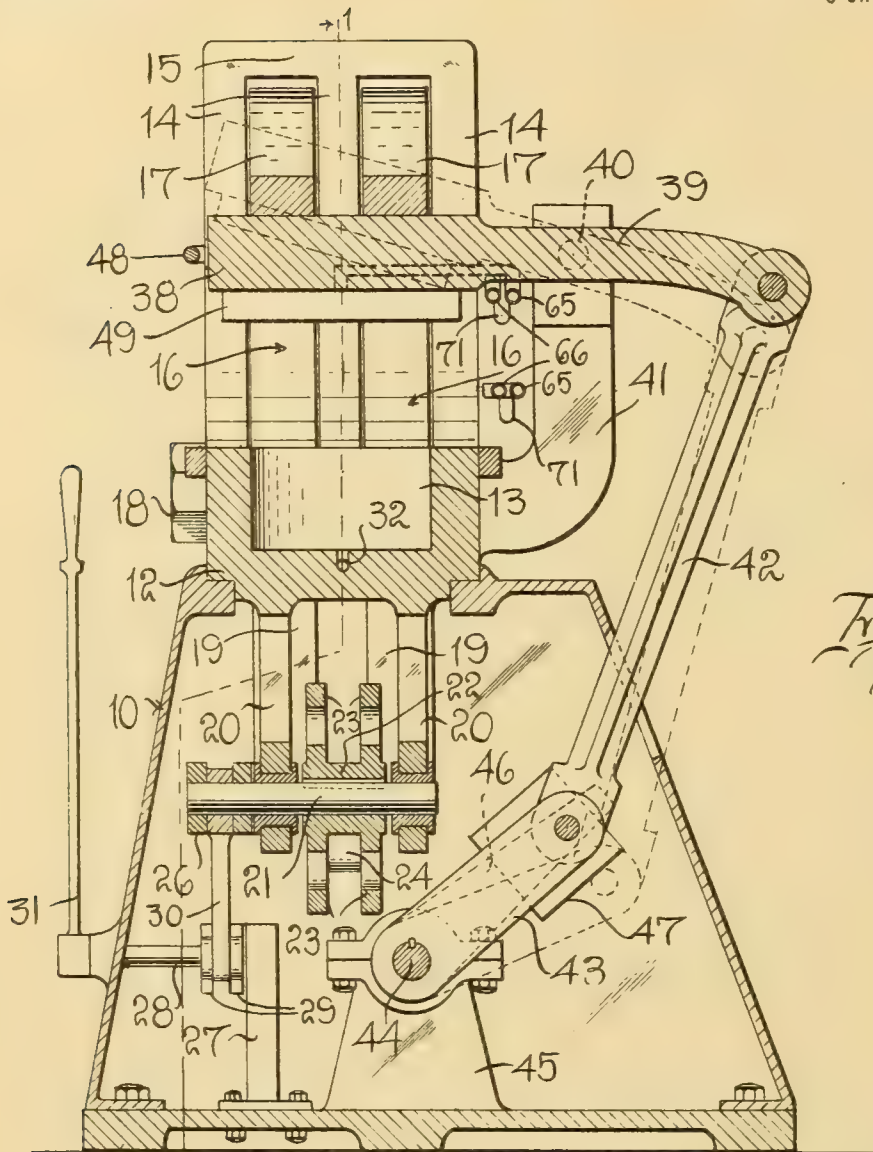


Fig. 2

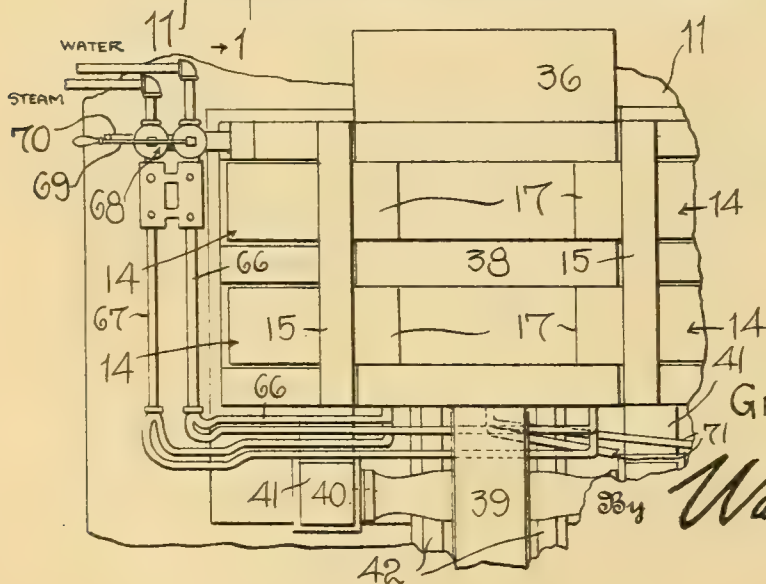


Fig. 6

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3 SHEETS—SHEET 3.

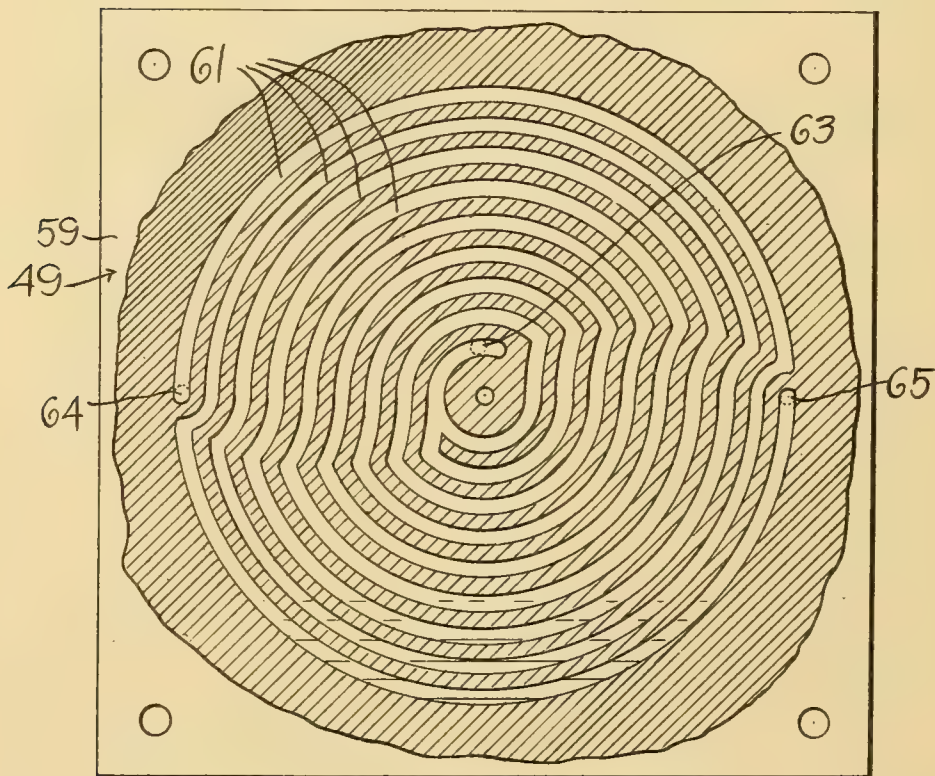
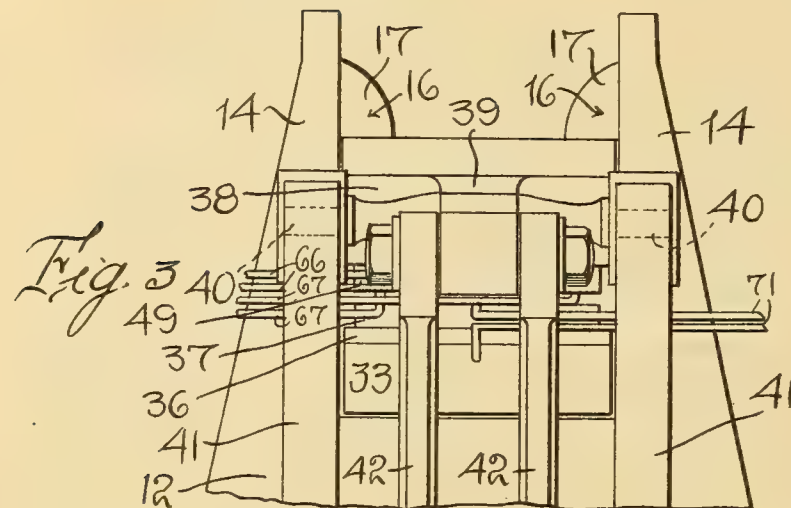


Fig. 5

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UNITED STATES PATENT OFFICE.

GEORGE E. DAVENPORT, OF CAMDEN, NEW JERSEY.

HAND-CONTROLLED HYDRAULIC PRESS.

1,269,060.

Specification of Letters Patent.

Patented June 11, 1918.

Application filed August 14, 1916. Serial No. 114,814.

To all whom it may concern:

Be it known that I, GEORGE E. DAVENPORT, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Hand-Controlled Hydraulic Presses, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to hydraulic presses and particularly to presses of this character used for stamping the flat record tablets or record disks used in talking machines.

One of the objects of this invention is to provide a construction of this character which is semi-automatic in its action, in that after being set by hand it is automatically released.

A further object of this invention is to provide a press of this character with die carrying plates so arranged that hot water or steam may be caused to circulate through the plates, or cold water may be caused to circulate and in this connection to provide means whereby live steam may be caused to circulate through the die holders prior to the insertion of the record blank and that when hydraulic pressure is applied, this live steam is immediately turned off and cold water is caused to automatically take its place in the circulation system of the die or die holders. The object of leaving steam in the dies is to keep the stock soft until the pressure is applied, whereupon the stock is chilled and hardens quickly.

A further object is to provide a machine of this character with a pivotally mounted "buck-head" which supports an upper matrix or die and provide means for locking this buck-head in its operative position, and means for raising the buck-head after the locking means are released.

Other objects will appear in the course of the following description.

45 My invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a section on the line 1—1 of Fig. 2;

50 Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an elevation of the upper end of the press;

Fig. 4 is a diametrical section through one of the die holders or dies and the matrix; 55 and

Fig. 5 is a section on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary top plan view showing the steam and water connections to the dies.

Referring to these figures, it will be seen that my improved hydraulic press comprises a housing 10 which is provided with a detachable base plate 11, and which incloses the mechanism which operates the buck-head 65 and the locking bars.

Mounted upon the upper end of the housing 10 is a relatively heavy base plate 12 bored out to provide the cylinder 13. Extending upward from the base 12 on each side of the base are three standards 14, these standards being connected at their upper ends by an integral cross bar 15, and these standards being preferably made integral with the base 12. The standards have vertical inner faces and outwardly and downwardly inclined outer faces and form guides for the piston and for the buck-head as will be later shown. Disposed between the standards 14 are the locking arms 16 there being a pair of these locking arms on each side of the machine. The locking arms have more or less the same shape of the standards, but at their upper ends are formed with the inwardly projecting heads 17, the under faces of which are horizontal. These locking bars are pivotally mounted upon transversely extending bolts 18 and the locking bars extend downward below the bolts 18 forming arms 19. Extending downward from the base 12 are brackets 20 which are formed with bearings of any suitable character for a transverse rock shaft 21. Keyed upon this rock shaft 21 and between the bearings of the brackets 20 is a sleeve 22 having the spaced disks 23, these disks being preferably slotted so as to secure lightness. The lower ends of the arms 19 are connected by means of links 24 to the disks 23 by means of bolts 25. The link 24 which engages with one pair of locking arms 16 is pivotally connected to the disks 23 at a point diametrically opposite the pivotal connection of the other link 24. It will thus be seen that when the member 22 is turned in one direction, the arms 19 will be drawn together and when turned in the other direction the arms 19 will be forced apart. For the purpose of rotating the shaft 21, I mount upon the shaft the crank arm 26 and mount upon a bearing bracket 27, 110

a shaft 28 which has a crank arm 29 connected by a link 30 to the crank arm 26. Mounted upon the shaft 28 is an operating lever 31 whereby the shaft 28 may be rocked.

5 Extending through the base 12 and to the center of the cylinder 13 is a duct 32 which is connected to a source of liquid under pressure. Operating within the cylinder 13 is a loose piston 33 whose lower portion is reduced to fit within the cylinder, while its upper portion, which is preferably formed as a separate block, is greater in diameter than the diameter of the cylinder. The plate 34 is attached by screws 35 or other means to the lower end of the piston. Resting upon the upper end of the block 33^a is an adjusting plate 36 and the die or matrix holder, designated 37, is mounted upon the adjusting plate.

20 For the purpose of carrying the upper die, I provide a "buck-head" 38 which operates between the standard 14 and which has a rearward extension 39 formed with trunnions 40 which engage with supporting brackets 41 extending upward from the base. The extremity of the buck-head arm or extension 39 is operatively connected by means of two links 42 to an arm 43 mounted upon a shaft 44, in turn mounted in bearing brackets 45. The arm 43 is mounted on the middle of a shaft 44, and at the extremities of the shaft 44 are disposed arms 46 carrying balance weights 47. These balance weights tend to turn the shaft 44 in such position as to raise the buck-head. The buck-head may be turned downward however, into its operative position however, by means of a handle 48 mounted upon the end face of the buck-head. Mounted upon the buck-head is the upper die or matrix holder 49.

The dies or matrix holders 37 and 49 both have the same character and one of these dies is illustrated in Figs. 4 and 5. The upper face of the die 37 (or the lower face of the die 49) is recessed as at 50 to receive the matrix 51, there being a central stud or pin 52 which engages the center of the matrix. Outward of the relatively slight recess 50 there is a relatively deep annular recess 53 whose exterior and interior walls are screw-threaded as at 54. A locking ring 55 engages in this screw-threaded annular recess 53, the locking ring having a flange 56 which projects over the edge of the matrix. The locking ring of course, has openings 57 for the reception of a wrench.

On its under face the die is formed with a relatively wide annular recess 58 defining an outer wall 59 and a central hub 60. The inner face of the outer wall and the outer face of the hub are screw-threaded. The die plate is formed with a plurality of approximately concentric grooves 61 forming circulating coils arranged as illustrated in

Fig. 5, and closing the open sides of these coils is a plate 62 which has screw-threaded engagement with hub 60 and the wall 59. Preferably there are two series of these grooves, both merging into each other at the center of the die but ending at diametrically opposite portions of the die. The center of the die is connected by means of a passage 63 to an outlet duct or pipe and the passages 64 and 65 which are disposed at diametrically opposite portions of the disk are connected one to a steam inlet pipe 66 and the other to a cold water inlet pipe 67.

These pipes 66 and 67 extend to a valve casing designated generally 68 of any suitable character having therein valves controlled by a lever 69 operating over a sector 70. This valve casing is, of course, connected to a source of steam and a source of water. The duct 63 of each die is connected to a waste pipe 71. The detailed construction of the casing and valves is not illustrated inasmuch as this may be of any suitable character. The duct 32 is connected to a source of water under pressure by means of any suitable pipe 72 which is connected to a waste pipe 73. The passage through the pipe 72 and waste pipe is controlled by a valve in turn operated by a lever 74. I have not shown in detail the construction for this valve as it is the valve ordinarily found in hydraulic presses for controlling the inlet of water thereto and the outlet therefrom. Preferably the block 33^a which forms part of the piston 33 is provided with a water way therethrough connected with a source of cold water so as to keep the piston from expanding in the cylinder.

The operation of the invention is as follows. The record stock which is in a pre-heated and relatively soft state is placed upon the bottom die 37 which supports the matrix plate. Live steam is flowing through the double coils or channels of this lower die and the upper die. The object of having steam circulating through these channels of the two dies is to keep the stock soft until the pressure is applied, as the stock, when chilled, hardens quickly. After the stock has been placed upon the lower die, the buck-head is then pulled down which closes the machine. As the buck-head moves downward it bears against the beveled ends of the locking heads 17 and forces the locking heads apart. As soon as the buck-head has passed below the locking heads, the locking bars 16 are shifted inward so as to hold the buck-head from any upward movement. The instant the machine is closed hydraulic pressure is admitted to the cylinder 13 forcing up the piston, thus bringing the two dies together at a pressure of 2200 pounds per square inch. As soon as the hydraulic pressure is applied, the live steam is turned off and cold water immediately

takes its place in the coils of the dies. Cold water is let flow through the dies for about thirty seconds, after which it is turned off, the pressure on the piston released and the
5 operating lever is thrown over to the position which will open the lock bars which allows the buck-head to rise to an open position through the action of the counter-weights 47. The record is then taken out,
10 fresh stock is placed in the press and the foregoing operation repeated. This machine can turn out over 550 records in a day of ten hours.

Having described my invention, what I
15 claim is:

1. A die of the character described having a recessed outer face, an outer annular groove deeper than the recess and having screw-threaded interior and exterior walls,
20 and means for holding a matrix in said recess comprising a screw-threaded ring hav-

ing a flange on its inner edge and adapted to engage in said screw-threaded recess.

2. In a press for stamping phonographic records, a die having a pair of fluid circu- 25
lating grooves, of channels formed therein, the pair of channels being approximately parallel and extending in a spiral course from the center of the die toward the cir- 30
cumference thereof, the channel terminating at diametrically opposite points of the die, there being an outlet duct communicating with both of said channels at their inner ends, the outer ends of the channels being
35 respectively connected to a source of steam and a source of cold water.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

GEORGE E. DAVENPORT.

Witnesses:

CHAS. B. BOULTON,
RALPH W. HAINES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

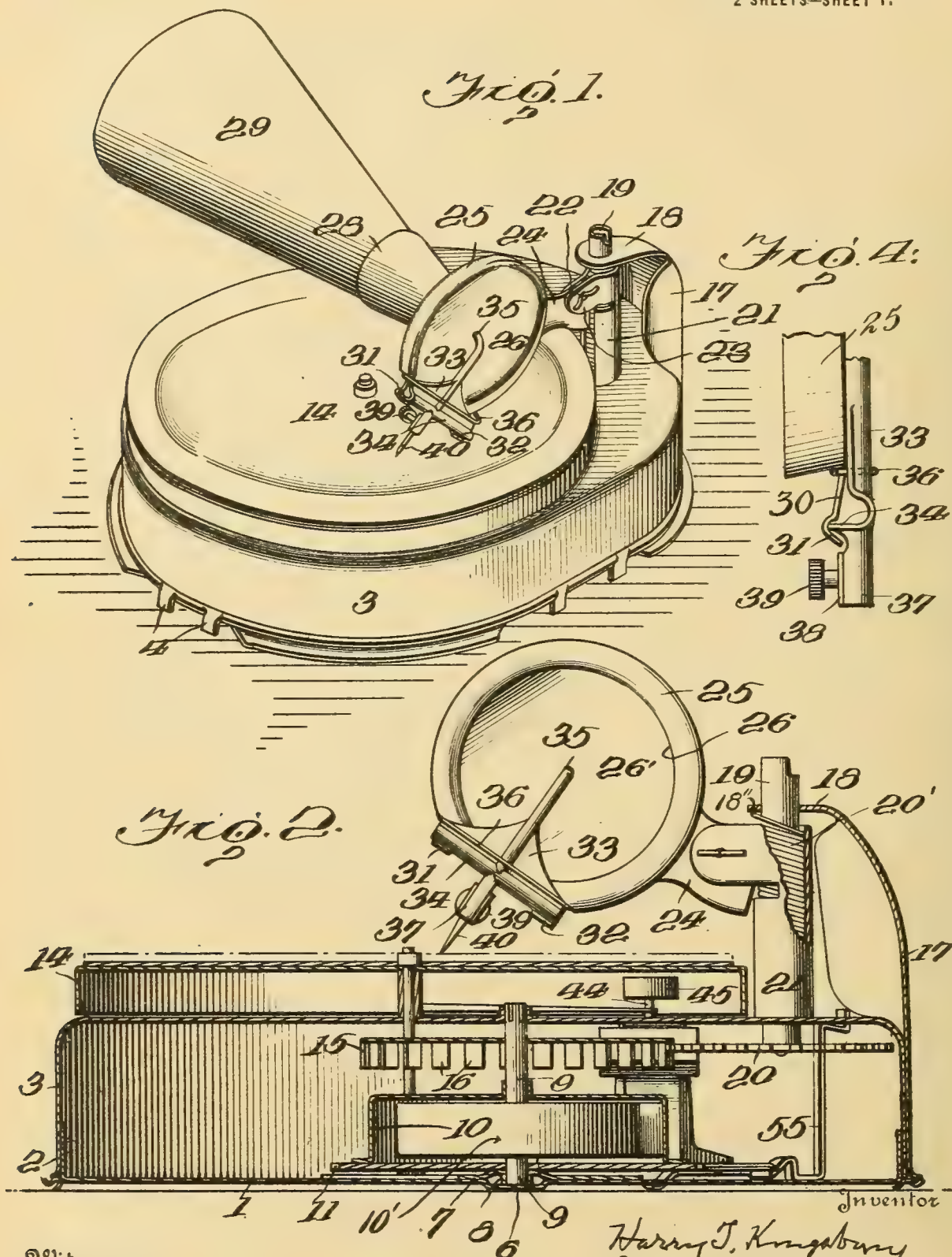
TALKING MACHINE.

1,269,089 ----- H.T. & E. J. Kingsbury,
Filed July 22, 1916,
Patented June 11, 1918.

H. T. & E. J. KINGSBURY.
TALKING MACHINE.
APPLICATION FILED JULY 22, 1916.

1,269,089.

Patented June 11, 1918.
2 SHEETS—SHEET 1.



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TALKING MACHINE.
APPLICATION FILED JULY 22, 1916.

1,269,089.

Patented June 11, 1918.
2 SHEETS—SHEET 2.

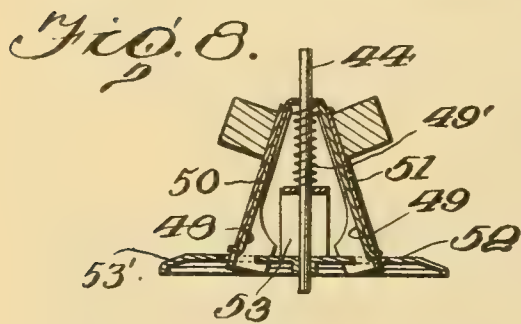
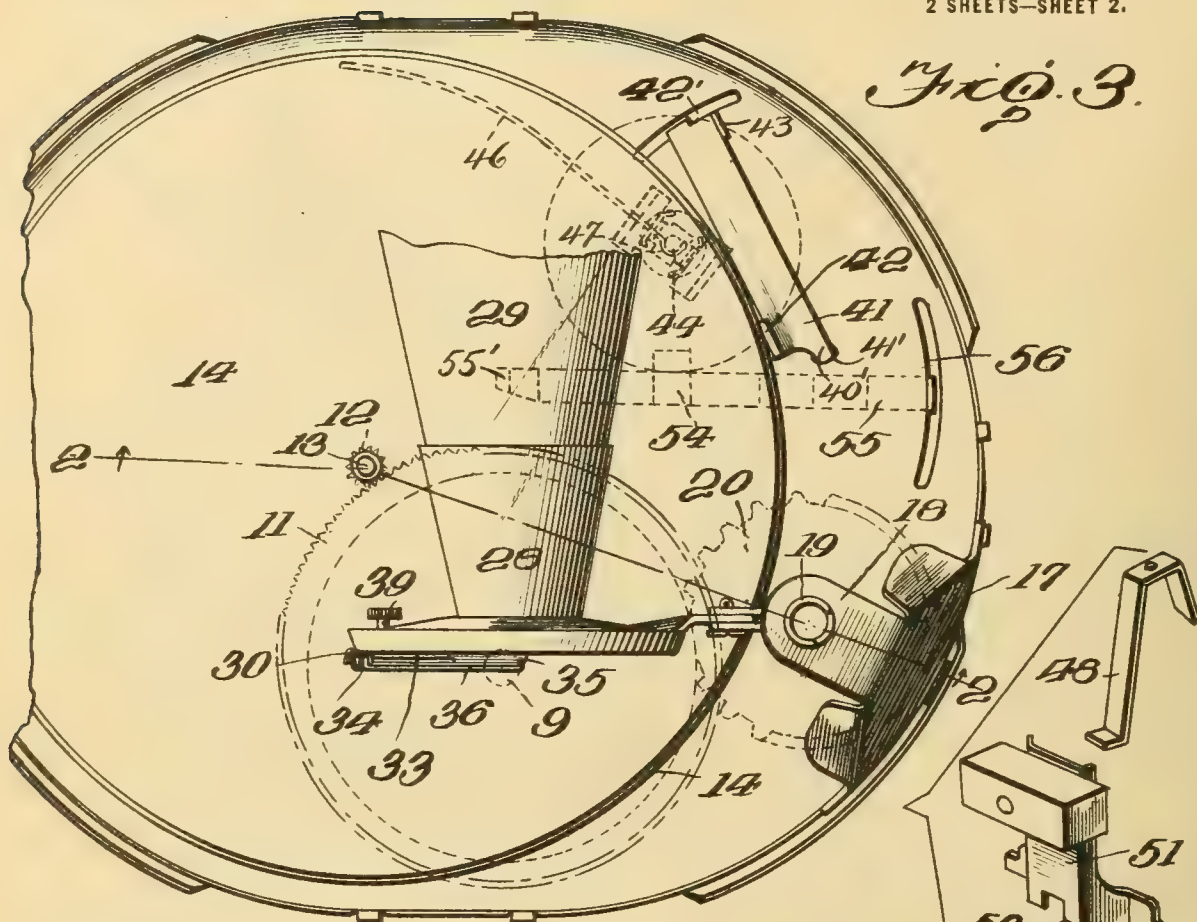


Fig. 6.

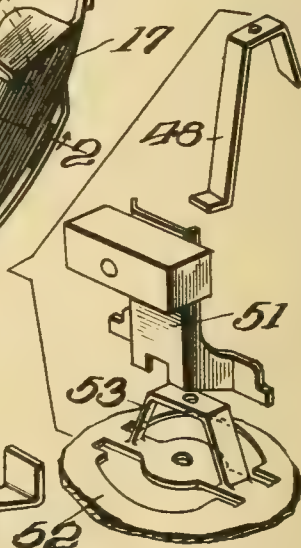


Fig. 9.

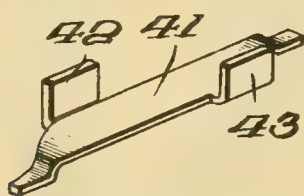


Fig. 7.

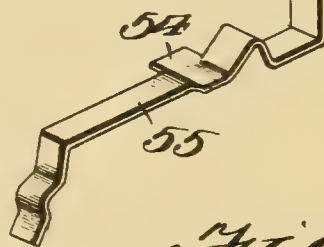
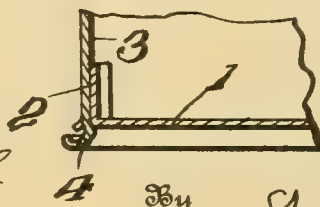


Fig. 5.



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UNITED STATES PATENT OFFICE.

HARRY T. KINGSBURY AND EDWARD J. KINGSBURY, OF KEENE, NEW HAMPSHIRE.

TALKING-MACHINE.

1,269,089.

Specification of Letters Patent. Patented June 11, 1918.

Application filed July 22, 1916. Serial No. 110,759.

To all whom it may concern:

Be it known that we, HARRY T. KINGSBURY and EDWARD J. KINGSBURY, citizens of the United States, residing at Keene, in the county of Cheshire, State of New Hampshire, have invented certain new and useful Improvements in Talking-Machines, of which the following is a description, reference being had to the accompanying drawing, and to the figures of reference marked thereon.

Our invention relates to improvements in talking machines.

One object of our invention is to provide a miniature talking machine in which the horn is supported by the sound box and in which the needle holder and stylus can be readily removed and also providing the pivot of the reproducer arm as the stem for winding the spring motor.

Another object of our invention is to provide a simple, cheap and durable talking machine, having certain details of construction and combination of parts hereinafter more fully described.

In the accompanying drawings:—

Figure 1 is a perspective view of my improved talking machines;

Fig. 2 is a vertical transverse sectional view of Fig. 1;

Fig. 3 is a top plan view of Fig. 1 showing the motor and other interior working parts in dotted lines;

Fig. 4 is an enlarged side elevation of the attaching means for the needle holder and stylus;

Fig. 5 is an enlarged sectional view of the securing means between the base and the motor housing;

Fig. 6 is a perspective view of the governor control lever;

Fig. 7 is a perspective view of the stop mechanism for the rotatable record supporting disk or table;

Fig. 8 is a vertical sectional view of the governor; and

Fig. 9 is a perspective view of the governor showing the several parts in their disassembled relation.

Referring now to the drawings; 1 represents the base of our improved talking machine and which is provided with upwardly turned portions 2 forming guides for the housing 3. The housing at its lower edge is provided with downwardly extending ears 4 arranged in pairs and spaced apart a dis-

tance slightly greater than the width of the upwardly turned portions 2 and adapted to be turned under against the lower face of the base 1 whereby the base and housing are locked together. The base 1 is provided with a downwardly depressed portion 6 and secured to the upper face of the base and surrounding the depressed portion is a plate 7 which has an opening and a downwardly extending flange 8 entering the depressed portion and forming a bearing. Mounted within the flange 8 and resting in the depressed portion is a shaft 9 around which is loosely arranged the drum 10. The lower end of the spring drum 10 is provided with a gear 11 which meshes with a small pinion 12 carried by the shaft 13. Within the drum 10 is a coiled spring 10' which has one end secured to the shaft 9 and the opposite end secured to the drum, whereby the drum is caused to rotate. Said shaft 13 has its lower end mounted in the base 1 and its upper end passing through and journaled in the housing 3 and carries at its upper end above the housing the record supporting table 14 all of which is well understood and needs no further description.

The shaft 9 above the spring drum 10 is provided with a gear 15 rigidly locked thereon. This gear is formed of a disk of sheet metal having a flange turned downwardly around its periphery and cut out to form teeth 16 as clearly shown in Fig. 2 of the drawings. The housing 3 on one side is provided with an upwardly extending arm 17 made of sheet metal and having its upper end 18 turned inwardly over the housing and in which is mounted a shaft 19 which extends through the upper end of the housing and has rigidly secured thereon a gear 20. This gear 20 meshes with the gear teeth 16 of the gear 15 and the upper end of the shaft 19 is formed to receive a crank whereby the shaft is rotated and the spring wound. The shaft 19 has a coil spring 20' surrounding the same and having its convolutions snugly engaging the shaft and has its upper end secured to the bracket 18 at 18'.

The lower end of the spring is free which allows the shaft to be freely rotated in a direction to unwind the spring so that the spring drum may be wound but in the reverse direction of the shaft causes the spring 20' to bind tightly against the shaft and hold the same against rotation. Mounted on the shaft between the base and the inwardly

turned portion 18 of the arm 17 is a sleeve 21 made of sheet metal and provided with outwardly extending ears 22 and 23 between which is pivoted the ear 24 carried by the sound box 25. The sleeve 21 is free to oscillate on the shaft and whereby the sound box is free to follow the sound grooves in the record, which will be later described.

The sound box 25 consists of a sheet of metal stamped in the form of a saucer with the flange 26 adapted to receive the diaphragm 26'. The center of said sheet of metal is provided with an opening and surrounding said opening is a funnel shaped member 28 adapted to support the horn 29, as clearly shown in Fig. 1 of the drawings. The sound box 25 has the sheet of metal of which it is formed provided with an extension 30 provided with the two curved ears 31 and 32. The stylus supporting member consists of a cross shaped member 33 made of sheet metal and the portion 34 resting in the curved ears and the portion 35 resting against the diaphragm 26' and said stylus supporting member is held in said position by the spring metal clip 36 which extends across the same and around the extension 30 of the sound box. The outer end of the stylus supporting member has a socket 37 formed by the plate 38 which carries a set screw 39 and whereby the needle 40 is removably supported in the said stylus member.

The upper end of the housing is provided with a slot 41' in which is pivotally mounted the downwardly turned end 40' of the lever 41 made of sheet metal and having the upwardly extending portion 42 adapted to engage the edge of the record supporting disk or table 14 and whereby the same is held against rotation. The outer end of the lever enters a slot 42' in the casing and frictionally engages the same for holding it in its adjusted position. Said slot serves as guide therefore and is provided with an upwardly extending portion 43 forming a finger grip whereby the lever is swung upon its pivot and portion 42 moved in engagement with the edge of the table 14 and wedges and holds itself thereagainst for stopping the table.

Mounted in the housing 3 is a speed governor for controlling the speed of the machine and which consists of a shaft 44 which is mounted in the base 1 and extends through the upper end of the housing and provided with a felt covered pulley 45 adapted to engage the inner periphery of the flange of the table 14 and whereby said shaft is driven from the said table. In order that the pulley will engage the table at all times, so as to drive the shaft, we provide a spring 46 secured to the housing at one end and having its opposite end provided with a semi-circular portion 47 which

embraces the shaft and as shown in Fig. 3 of the drawings, normally holds the pulley in engagement with the table. The shaft 44 has rigidly secured thereto adjacent its upper end, the arms 48 and 49 which have hooked lower ends engaging the pivoted weight carrying members 50 and 51 pivoted in the disk 52. The disk 52 is loosely mounted upon the shaft so as to have a vertical movement thereon also carries the rigid arm 53, through which the shaft 44 loosely passes, and between the said arm and the arms 48 and 49 and surrounding the shaft 44 is a coil spring 49' which bears on the arm 53 and holds the disk 52 in its downward position, which in turn holds the weight carrying members 50 and 51 in their inward position. The disk 52 has the bevel face 53' which engages the extension 54 of the lever 55 pivoted in a slot 55' (as shown in Fig. 3) in the base and extending up through the slot 56 in the housing. The lever 55 is sprung into position and presses against the underface of the top of the case and is thus held by friction in any position in which it is placed. When the motor speeds up the weighted members 50 and 51 draw the disk 52 upwardly against the extension 54 and retards the record supporting table and by swinging the lever the movement of the lever is varied before it engages the extension, owing to the beveled face 53 as will be readily understood.

It is obvious that minor changes in the details of construction and arrangement of parts may be made without departing from the spirit of the invention, as set forth in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A talking machine comprising a housing, a spring driven drum in said housing, a record supporting table driven by the drum, a shaft extending upwardly through the casing, means connecting the shaft with the spring within the drum for winding the spring for driving the drum and a sound box mounted upon the winding shaft.

2. A talking machine comprising a housing, a spring driven drum in said housing, a record supporting table driven by the drum, a shaft extending upwardly through the casing, means connecting the lower end of the shaft with the spring within the drum for winding the spring for driving the drum, a sleeve loosely mounted on the shaft above the casing, and a sound box pivoted on said sleeve.

3. A talking machine comprising a housing, a spring driven drum in said housing, a record supporting table driven by the drum, a shaft extending upwardly through the casing, means connecting the lower end of the shaft with the spring within the drum for

winding the spring for driving the drum, a sleeve loosely mounted on the said shaft above the casing, ears carried by said sleeve and a sound box having an ear pivoted between the ears on the sleeve.

4. A talking machine comprising a housing, a spring driven drum in said housing, a record supporting table driven by the drum, a shaft extending upwardly through the casing, means connecting the lower end of the shaft with the spring within the drum for winding the spring for driving the drum, a sleeve loosely mounted on said shaft above the casing, ears carried by said sleeve, a sound box having an ear pivoted between the ears on the sleeve and the upper end of the shaft above the sleeve constructed to receive a crank whereby the same may be rotated for winding the drum.

5. A talking machine comprising a housing, a spring driven drum in said housing, a shaft extending into the drum and connected to the spring, a record supporting table above the housing and driven by the drum, a shaft extending vertically through the casing, gears connecting the shafts for winding the spring, a sound box pivotally mounted on said vertically extending shaft to move in a vertical and horizontal plane, a speed governor driven by the table for controlling the speed of the governor, and a stop pivoted to the housing and adapted to engage the table for stopping the same.

6. A talking machine comprising a housing, a spring driven drum in said housing, a vertical shaft in the housing and driven by the drum, a record supporting table carried by the shaft, a speed governor driven by the table, means for controlling the speed of said governor, a shaft vertically disposed in said housing, a gear carried by the lower end of the shaft and meshing with a gear carried by the shaft connected to the spring, the upper end of the shaft having means for receiving a crank whereby it is rotated to wind the spring, a spring tightly surrounding the shaft and adapted to form a lock to prevent the rotation thereof in one direction, a sleeve surrounding the spring and having outwardly extending vertical parallel ears, a sound box having an ear extending between the ears of the sleeve and pivoted therebetween and means for engaging the record supporting table for stopping the same.

7. A talking machine comprising a housing, a spring driven drum in said housing, a record supporting table supported above the housing and driven by the drum, a verti-

cal shaft extending into the housing, a gear connection between the spring and the shaft for winding the spring, through the shaft, a sleeve loosely mounted on the shaft above the housing, a sound box horizontally pivoted to said sleeve, a speed governor driven by the record supporting table, a lever for varying the speed of the governor, and a stop pivoted to the housing and engaging the edge of the table for stopping the same.

8. A talking machine comprising a housing, a spring-driven drum in said housing, a vertical shaft in the housing and driven by the drum, a record-supporting table carried by the said shaft, a second shaft extending vertically into said housing, a winding shaft extending from said drum and carrying a gear, a gear carried by said second shaft and meshing with said gear carried by the shaft extending from said drum, the upper end of the shaft constructed to receive a crank for rotating the same, whereby the spring in the drum is wound, a coiled spring closely surrounding the second shaft and forming a lock to prevent the backward movement of the shaft, a sleeve loosely surrounding the spring and having outwardly extending vertical parallel ears, a sound-box having ears pivoted between the ears of the sleeve, and a stop for the record-supporting table for stopping the same.

9. A talking machine comprising a housing, a spring driven drum in said housing, a record supporting table above the housing, means connecting the drum and table for rotating the table, a vertical shaft extending into the housing, a gear connection for winding the spring within the drum, a sleeve loosely mounted on the shaft above the housing, and a sound box horizontally pivoted to said sleeve, whereby the sound box may be swung over the record and lowered thereon.

10. A talking machine comprising a housing, a record supporting table above the housing, means within the housing for rotating the table, a vertical shaft for winding the table rotating means and extending above the housing, and a sound box carried by the shaft and having a vertical and horizontal movement thereon.

In testimony whereof we affix our signatures, in the presence of two witnesses.

HARRY T. KINGSBURY.

EDWARD J. KINGSBURY.

Witnesses:

CHESTER L. KINGSBURY,

HELEN G. CLARK.

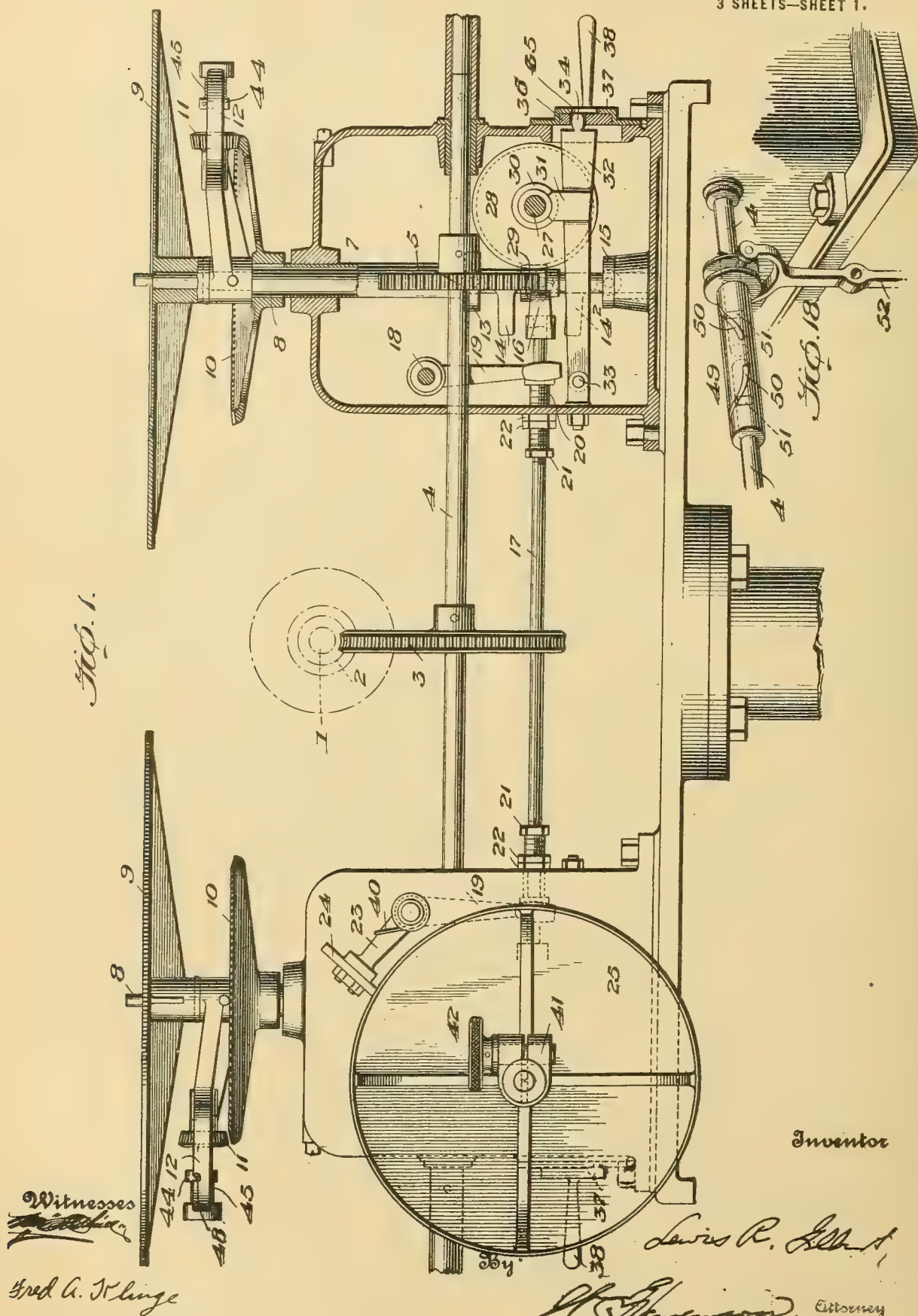
AUTOMATICALLY ACTING MULTIPLE RECORD SUPPORTING
TABLE.

1,269,175 ----- L. R. Gilbert,
Filed June 26, 1914,
Patented June 11, 1918.

L. R. GILBERT.
 AUTOMATICALLY ACTING MULTIPLE RECORD SUPPORTING TABLE.
 APPLICATION FILED JUNE 26, 1914.

1,269,175.

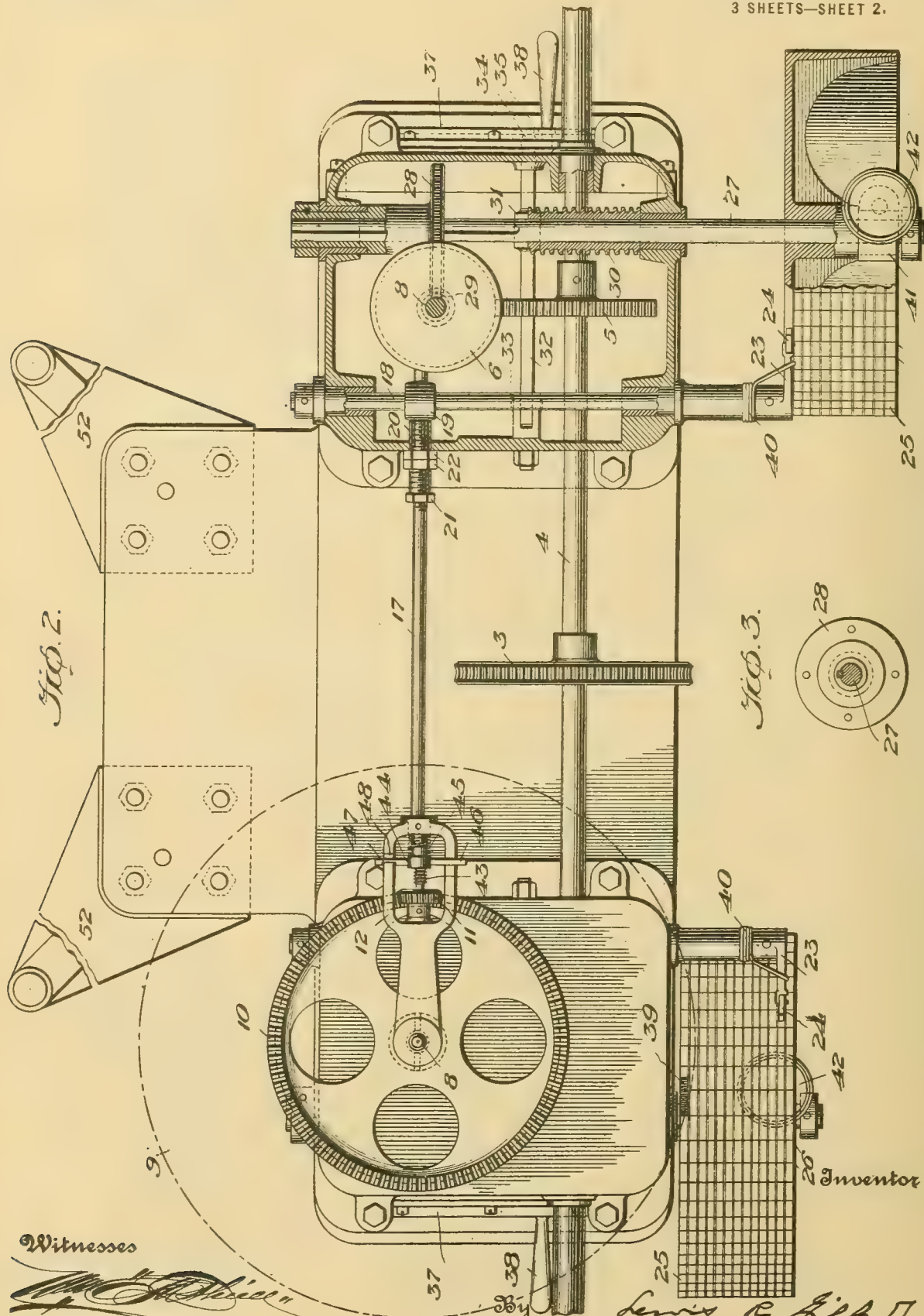
Patented June 11, 1918.
 3 SHEETS—SHEET 1.



L. R. GILBERT.
 AUTOMATICALLY ACTING MULTIPLE RECORD SUPPORTING TABLE.
 APPLICATION FILED JUNE 26, 1914.

1,269,175.

Patented June 11, 1918.
 3 SHEETS—SHEET 2.



Witnesses

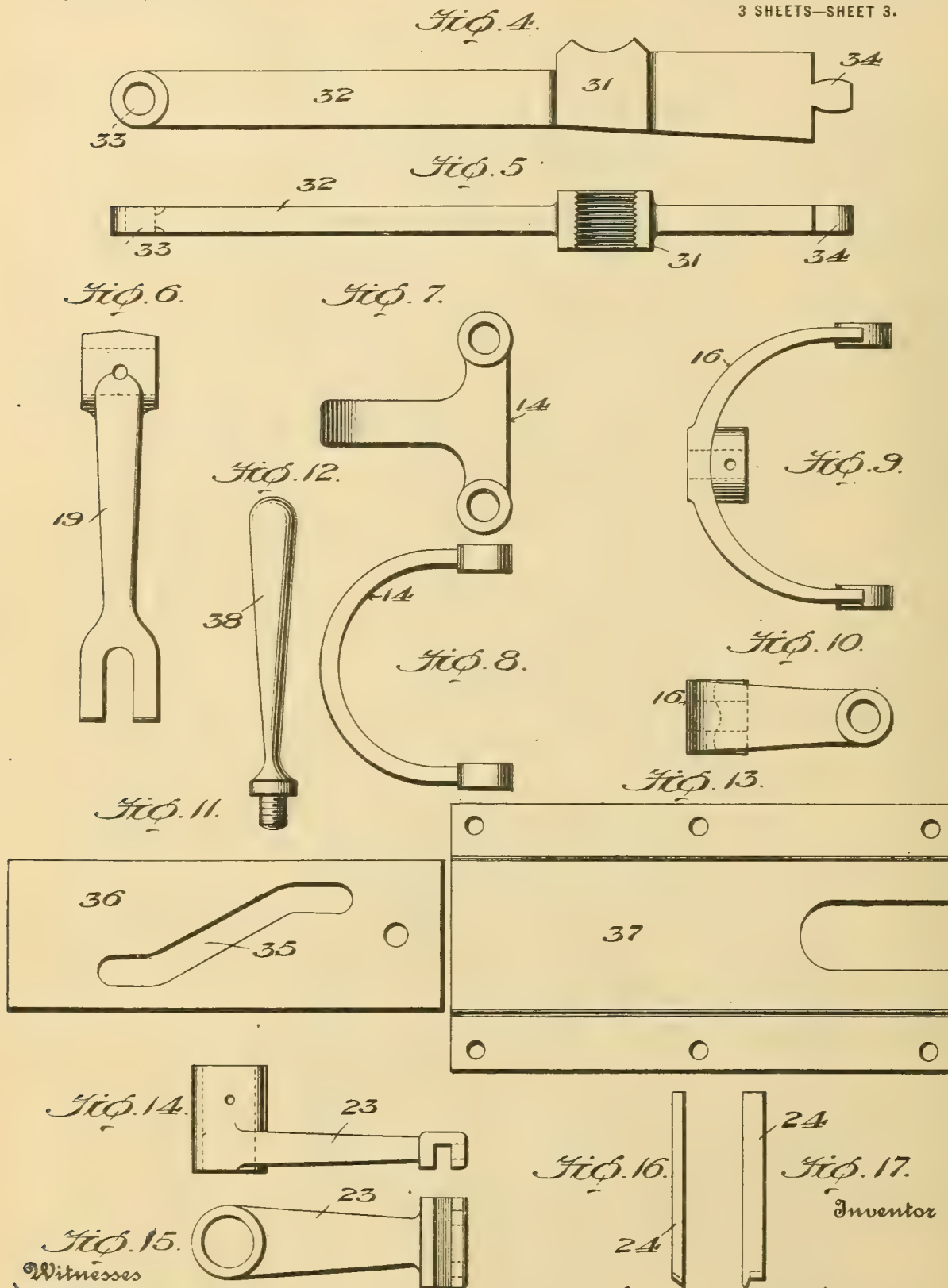
Fred A. Klinge

Lewis R. Gilbert
Attorney

L. R. GILBERT.
 AUTOMATICALLY ACTING MULTIPLE RECORD SUPPORTING TABLE.
 APPLICATION FILED JUNE 26, 1914.

1,269,175.

Patented June 11, 1918.
 3 SHEETS—SHEET 3.



Witnesses
[Signature]
 Fred A. Klinge

Inventor
 Lewis R. Gilbert,
 By *[Signature]*, Attorney

UNITED STATES PATENT OFFICE.

LEWIS RICHARD GILBERT, OF NEW YORK, N. Y., ASSIGNOR TO GEORGE REGESTER WEBB,
OF BALTIMORE, MARYLAND.

AUTOMATICALLY-ACTING MULTIPLE-RECORD-SUPPORTING TABLE.

1,269,175.

Specification of Letters Patent. Patented June 11, 1918.

Application filed June 26, 1914. Serial No. 847,462.

To all whom it may concern:

Be it known that I, LEWIS RICHARD GILBERT, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatically-Acting Multiple-Record-Supporting Tables; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to tables for supporting sound reproducing records, and more particularly to that type of such tables in which one table with its record is automatically brought into operation at the time that another table and its record is thrown out of operation. The present invention contemplates a plurality of carrying tables coupled one with the other so that as one record is exhausted its table is brought to a state of rest and simultaneously another record-carrying table is automatically brought into action so that its record may be used for reproducing purposes and while being so used a new record may be placed on the other table, and so on in alternation, and thus making it possible to have practically a continuous reproduction from records without the annoyances incident to temporary cessation of sound reproduction. The present invention in its practical embodiment comprises a plurality of record carrying turntables, each constructed like the other, and one coupled to the other so that automatically one will be brought to a state of rest while the other is put in motion, each having associated with it a grooved drum calibrated to correspond with the grooves of the records and having a trigger coöperating with the drum so that when the record has reached its limit of reproduction the trigger will set parts in operation to stop the table whose record has become exhausted and simultaneously set in motion the other record carrying table whose trigger has been placed in position on its drum for action in manner similar to the trigger and drum of the other table, and so on in

alternation from one table to the other. The invention furthermore contemplates the provision of a cushioning device which will absorb the shocks that otherwise might tend to disengage or shift the position of the reproducing needle in relation to the record or the position of engagement of the trigger with the calibrated drum. It furthermore contemplates a variable coupling between the record reproducing mechanism and the projector of a motion picture device so that the travel of the film of the motion picture device may be regulated or controlled to bring it into synchronism with the sound reproducing mechanism should the synchronism between the two devices be temporarily disturbed.

To the accomplishment of the foregoing and such other objects as may be made hereinafter to appear the invention consists in the several features hereinafter particularly described and then sought to be clearly defined by the claims, reference being had to the accompanying drawings forming a part hereof, and in which:

Figure 1 is a plan view of the apparatus, with parts in horizontal section;

Fig. 2 is a side elevation, with parts in vertical section;

Fig. 3 is a cross section through the drum shaft with its worm gear in full lines;

Fig. 4 a side view, and Fig. 5 a plan view of the arm carrying the sectional nut for the screw of the drum shaft;

Fig. 6 a front view of the rock shaft arm;

Fig. 7 a side view, and Fig. 8 a plan view of one of the quill lifting links;

Fig. 9 a plan view, and Fig. 10 a side view of the yoke which connects the two links;

Fig. 11 a side view of the cam-plate that raises and lowers the sectional nut carrying arm;

Fig. 12 a side view of the handle for manipulating the cam-plate;

Fig. 13 a side view of the cover for the cam-plate;

Fig. 14 a plan view, and Fig. 15 a side view of the trigger;

Fig. 16 an edge view and Fig. 17 a view at right angles thereto, of the trigger needle;

Fig. 18 a perspective of a portion of the casing of one table with the cam sleeve coupling two sections of the projector shaft

with means for shifting the sleeve to accelerate or retard the film of the projector.

In the drawings the numeral 1 designates a shaft driven from an electric motor or
 5 other power source and having a worm 2 which meshes with a worm gear 3 on a shaft 4 which will be termed the projector shaft because it is designed to drive the projector of a motion picture machine (not shown).
 10 This shaft also drives, through mechanism to be described, the turn tables carrying sound reproducing records of which two such tables are illustrated and as the mechanism of each table is the same, the description of one will answer for both, and is as follows: To the projector shaft is connected a worm-gear 5 which meshes with a worm-gear 6 secured to a quill 7 encircling the upright rotatable shaft 8 which carries at its
 20 upper end the disk or plate 9 on which will be supported the reproducing record. To the upper end of the quill 7 is attached a latch-gear 10, so termed for convenience because when the quill is raised it coöperates with a latch comprising a pinion 11 mounted
 25 in the frame of an arm 12 rigidly connected to the turn table or record carrying shaft 8 so that when the gear and pinion are in mesh with each other the shaft carrying the record will be rotated, and at other times
 30 when the gear and pinion are not latched together the record and its carrying shaft will be at rest.

To effect the movement of the quill 7 for
 35 the above purpose a collar 13 at the lower end of the quill and encircling the shaft 8 has one end of a yoke-link 14 pivotally connected to it, the other end being pivotally connected to the adjacent end of a second yoke
 40 link 14² the other end of which is pivotally connected to a collar 15 of a bushing encircling the lower end of shaft 8, the meeting ends of the links being pivotally connected to a yoke 16 to which is attached one end
 45 of a rod 17 the other end of which is connected to the corresponding yoke of the other table so that as this rod is moved longitudinally the adjacent ends of the links of one table will be thrown in one direction so as to
 50 lift the quill and cause the latch gear and pinion of the arm 12 to latch or engage with each other to cause the table shaft to rotate as shown at the right of Fig. 7, while the corresponding links of the other table will be
 55 thrown or drawn in the other direction to cause the quill of that table to be lowered and the latch gear and pinion of that table to be unlatched or disengaged so that table will be at rest. When the connecting rod is
 60 moved in the other direction the table which was at rest will be thrown into action and the one that was in action will be brought to a state of rest, and so on in alternation as long as the machine is running.

65 For the purpose of shifting the connecting

rod to produce the action above mentioned, each table is provided with a rock shaft 18 from which extends an arm 19 the fork end of which straddles the connecting rod and will contact with the head of a sleeve 20
 70 having a threaded connection with the rod so as to be adjusted thereon for setting the throw of the forked arm, the sleeve being held to its adjustment by suitable means, for instance by the lock nut 21, and also provided with stop nuts 22 threaded to the exterior of the sleeve so as to limit the stroke of the rod.

The rock shaft 18 has connected to one end a trigger 23 provided with a blade or needle
 80 24 which engages a spiral groove 25 formed in the periphery of a drum 26 attached to a shaft 27 journaled in suitable bearings in the casing of the table and having connected thereto a worm-gear 28 between which and
 85 the shaft is a feathered connection (shown in Fig. 3) to permit the shaft to turn therewith and also have a longitudinal movement in relation thereto, said gear meshing with a worm 29 attached to the turn-table shaft 8.
 90 The shaft 27 has also attached to it a screw 30 which is adapted to engage a sectional nut 31 carried by an arm 32 hinged at 33 to the casing of the table and having at its
 95 opposite end a stud 34 fitting in a camway 35 formed in a slidable-plate 36 inclosed by a cover 37 and provided with a handle 38 by which the cam-plate may be moved so as to raise or lower the arm 32 to make and break
 100 connection between its screw 30 and sectional nut 31. When the latch gear 10 is latched to the pinion 11 of the latch arm and the record is rotated, the drum 26 is rotated, and at the same time is moved longitudinally
 105 of the axis of its shaft by reason of engagement of its screw with the sectional nut mentioned so that the drum is given a rotary as well as a horizontal movement, thus causing the needle of the trigger to follow the spiral
 110 groove in the periphery of the drum, and when the needle reaches the end of the groove it drops into a recess or cut away portion 39 made in the drum, its movement being assisted by a spring 40, which also
 115 serves to hold the trigger needle in the groove, and as the trigger drops the shaft 18 rocks and its forked arm slides the connecting rod 17 so that the quill lowers, and disengages the latch gear and its pinion and stops the rotation of the record carrying
 120 shaft and the drum while at the same time the other table is automatically set into operation by lifting of its quill and engagement of its latch gear and latch pinion, so that its record is rotated, and thus the operation is
 125 repeated during the running of the machine, the tables being alternately thrown into and out of action as specified.

When one table is brought to a state of rest as just mentioned, the spirally grooved
 130

drum is moved to its starting position by lowering the arm carrying the sectional nut by manipulation of the cam plate previously mentioned and then the shaft is slid back
 5 to its starting position and the sectional nut brought again into engagement with the screw of the shaft so that the parts will be in position for action when the record of the other table becomes exhausted and another record brought into action.
 10

The spirally grooved drum is secured to its shaft by a clamp ring 41 encircling the split hub of the drum and controlled by a clamping screw 42. This enables the drum
 15 to be adjusted on its shaft both lengthwise thereof and circularly so as to bring the needle of the trigger to the groove and point of the groove in the drum corresponding to the position of the record reproducing
 20 needle in relation to the starting point of the record. It may be mentioned that the screw of the drum shaft has the same pitch as the spiral in the periphery of the drum, and that the spiral of the latter corresponds
 25 with the spiral of the record.

For the purpose of absorbing the shock incident to starting the rotation of the tables due to the latch gear while in motion being brought into engagement with latch
 30 pinion 11 while the latter is at rest, the pinion is mounted on a screw shaft or arbor 43 provided with a nut 44 between which and a suitable abutment and connected to both is a contractile spring 45, and the nut
 35 is provided with a transverse pin or rod 46 formed with a shoulder 47 which when the nut has traveled its limit will drop into a notch 48 formed in the frame of the arm 12 so as to lock the nut with the spring held
 40 under tension. With this cushion or shock absorber, when the latch gear is brought into mesh with the latch pinion the latter turns freely with the screw so as to feed forward the nut and gradually increase the
 45 tension of the spring so that the pinion is started under a spring tension or cushion that absorbs the shock otherwise liable to occur.

In combined motion picture and talking
 50 machines it not infrequently happens that the sound reproducing device and the picture projector get out of synchronism. To bring the two devices into synchronism without disturbing the sound reproducer,
 55 one section of the projector shaft 4 is connected to the other section of the shaft extending into the projecting machine by a sleeve coupling 49 formed with inclined or cam slots 50 into which pins 51 extending
 60 from the two sections of the projector shaft extend so that when the sleeve is caused to slide by a suitable lever, such as 52, the section of shaft which enters the projecting machine will be accelerated or retarded in
 65 its rotation, according to the direction in

which the sleeve coupling is moved, and thus the picture film is advanced or restrained so as to restore synchronism between the projector and the sound reproducer.
 70

Transmitters (not shown) will be supported on brackets 52 so that the needles carried by their arms will fit in the grooves of the records.

The operation of the several parts of the
 75 apparatus will be obvious from the foregoing description without repetition or amplification, and the advantages derived will be appreciated by those skilled in this art.
 80

The preferred embodiment and details of the device have been fully illustrated and described but it is not the intention to limit the invention to the specific details set forth as changes may be made therein without de-
 85 parture from the essential features of the invention.

Having described my invention and set forth its merits what I claim is:—

1. A plurality of record-supporting tables,
 90 driving mechanism including cooperating toothed wheels for each table for rendering its record alternately active and inactive, a coupling connecting the driving mechanism of one table with like mechanism of the
 95 other table, means for automatically actuating said coupling to bring the record of one table to a state of rest and give motion to the record of the other table, and a shock absorbing device associated with one of the
 100 cooperating toothed wheels of the driving mechanism to take up the shock incident to initial intermeshing of the teeth of the two wheels.

2. A plurality of record-supporting tables,
 105 driving mechanism for each table for rendering its record alternately active and inactive, a coupling connecting the driving mechanism of one table with like mechanism of the other table, a trigger connected with
 110 said coupling, and a drum cooperatively related to said trigger and serving to hold the trigger in one position while a record is in action and to release the trigger when the record is to be brought to a state of rest
 115 and the record of the other table is to be made active.

3. A plurality of record-supporting tables,
 120 driving mechanism for each table for rendering its record alternately active and inactive, a coupling connecting the driving mechanism of one table with like mechanism of the other table, a trigger connected with said coupling, a rotatable drum cooperatively related to said trigger and serving
 125 to hold the trigger in one position while a record is in action and to release the trigger when the record is to be brought to a state of rest and the record of the other table is to be made active, and means for
 130

moving said drum in one direction relatively to said trigger while rotated in another direction.

4. In a talking machine, driving mechanism for rendering the record alternately active and inactive, a trigger and means connecting it with the driving mechanism, a rotatable drum coöperatively related to the trigger and serving to hold it in one position while the record is active and to release it when the record is to be brought to a state of rest, said drum being adjustable circularly and horizontally for setting with reference to the point of contact of the trigger therewith, and means for moving said drum in one direction relatively to the trigger while in rotation.

5. In a talking machine, driving mechanism for rendering the record alternately active and inactive, a trigger and means connecting it with the driving mechanism, a rotatable drum coöperatively related to the trigger and serving to hold it in one position while the record is active and to release it when the record is to be brought to a state of rest, means for feeding the drum horizontally in relation to the trigger while being rotated, and means for releasing the feeding means to permit the drum to be restored to its starting position.

6. In a talking machine, a rotatable shaft carrying a record supporting member, and a worm, an arm secured to said shaft and provided with a pinion, a quill slidable on said shaft and provided at its upper end with a gear to mesh with said pinion and at a lower point with a gear, a drive shaft provided with a gear meshing with the gear of said quill, a feathered shaft having a worm-

gear meshing with the worm of the record carrying shaft, a drum mounted on the feathered shaft, a screw on the latter shaft, a nut arranged to be engaged and disengaged with said screw for feeding the drum shaft, and a trigger in operative relation to said drum, and connections between it and the quill shaft to stop the rotation of the record and the drum when the trigger is released from the drum and to rotate the record and drum while the trigger is in operative engagement with the drum.

7. In a record supporting table, a rotatable shaft carrying a record-supporting member and provided with an arm carrying a pinion, a driven gear arranged to engage the pinion for rotating the record carrying shaft, and a shock absorbing device associated with said pinion to take up the shock incident to starting the rotation of the record-carrying shaft.

8. In a record-supporting table, a rotatable shaft carrying a record-supporting member and provided with an arm carrying a pinion, a driven gear coöperating with said pinion for rotating the record-carrying shaft, and a shock absorber associated with said pinion and comprising a threaded shaft rotatable with the pinion, a nut traveling on the threaded shaft, a spring whose tension is increased by said nut, and means to lock the nut with the spring under tension.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS RICHARD GILBERT.

Witnesses:

WILLIAM HEINILLE,

WILLIAM PEPPER CONSTABLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

TONE-ARM.

1,269,266 ----- Z. Ecklebarger,
Filed June 16, 1917,
Patented June 11, 1918.

Z. ECKLEBARGER.

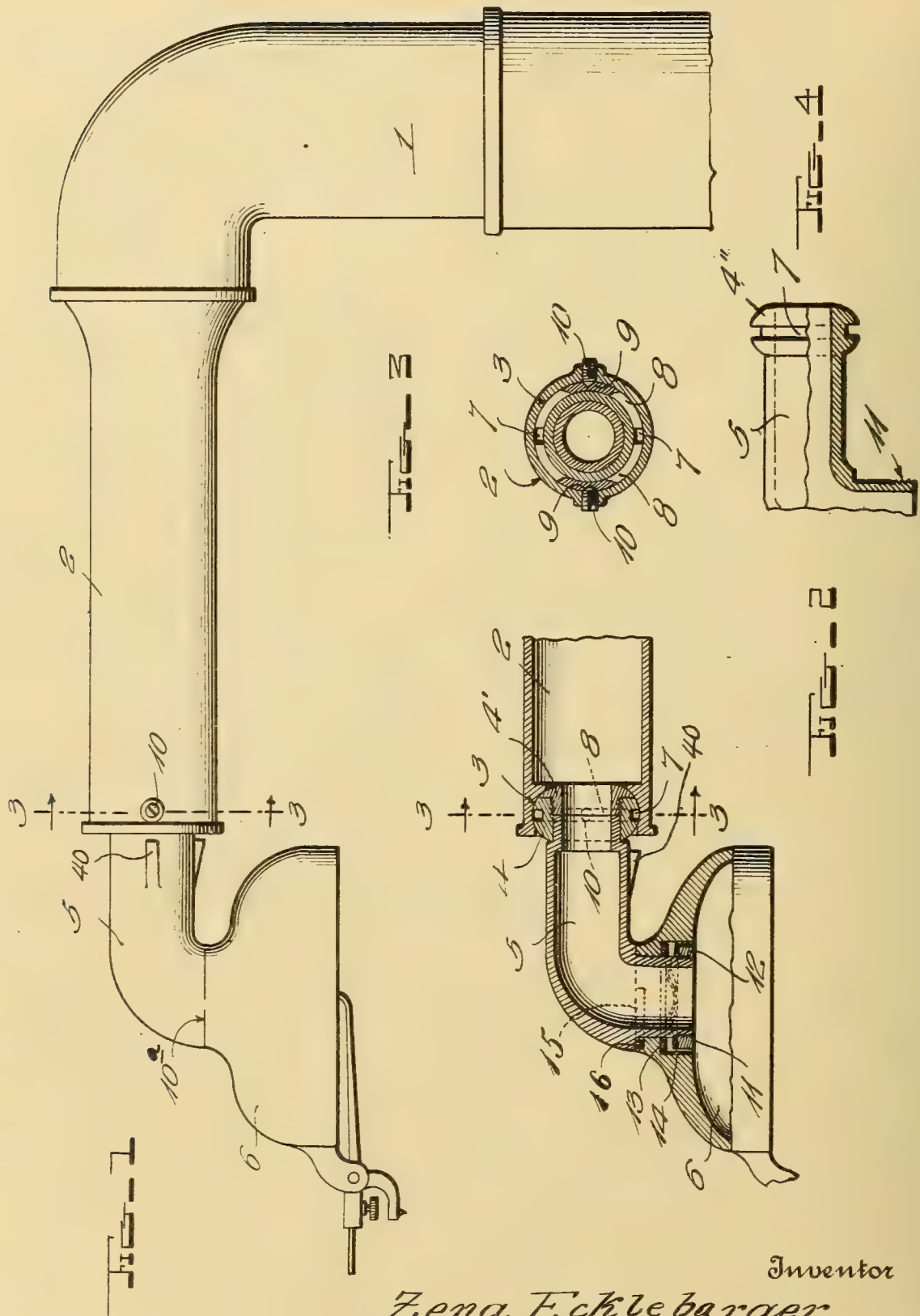
TONE ARM.

APPLICATION FILED JUNE 16, 1917.

1,269,266.

Patented June 11, 1918.

2 SHEETS—SHEET 1.



Inventor

Zena Eckle barger

By James Sheehy & Co., Attorneys

Z. ECKLEBARGER.

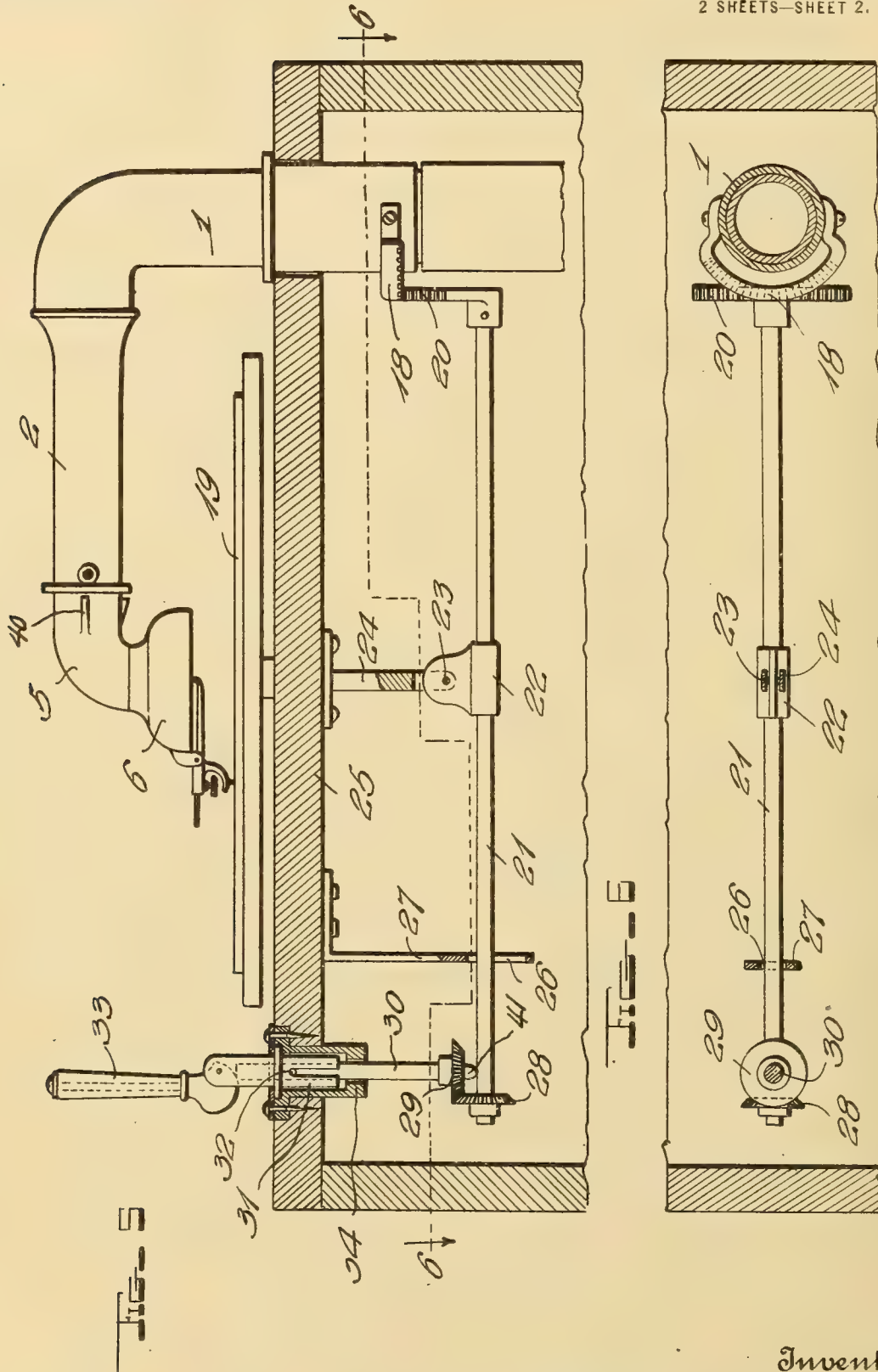
TONE ARM.

APPLICATION FILED JUNE 16, 1917.

1,269,266.

Patented June 11, 1918.

2 SHEETS—SHEET 2.



Inventor

Zena Ecklebarger

By *James J. Sheehy & Co.* Attorneys.

UNITED STATES PATENT OFFICE.

ZENA ECKLEBARGER, OF GOSHEN, INDIANA.

TONE-ARM.

1,269,266.

Specification of Letters Patent.

Patented June 11, 1918.

Application filed June 16, 1917. Serial No. 175,205.

To all whom it may concern:

Be it known that I, ZENA ECKLEBARGER, a citizen of the United States, residing at Goshen, in the county of Elkhart and State of Indiana, have invented new and useful Improvements in Tone-Arms, of which the following is a specification.

My present invention pertains to reproducers for use in sound-reproducing machines and more particularly to the tone arm of reproducers and means for moving the same; and it consists in the peculiar and advantageous tone arm hereinafter described and definitely claimed.

In the accompanying drawings which are hereby made a part hereof:

Figure 1 is a side elevation of a tone arm embodying my present invention.

Fig. 2 is a detail vertical section of the same.

Fig. 3 is a cross-section on line 3—3 of Figs. 1 and 2.

Fig. 4 is a detail view of the arm section 5.

Fig. 5 shows the arm and means for moving the same.

Fig. 6 is a section on line 6—6 of Fig. 5.

Similar numerals of reference designate corresponding parts in all of the views of the drawings.

The upright portion 1 of the tone arm may be of the ordinary construction such as illustrated or of any other construction compatible with my invention without involving departure from the scope of the invention as claimed, as may also the tone arm portion 2 that reaches laterally from the upper end portion 1, excepting that the forward end of the said portion 2 is provided with a socket 3 for the reception of a ball 4 on the rear end of the portion or section 5 that is interposed between the portion 2 and the sound box 6.

At this point I would have it understood that the sound box 6 *per se* may be of the construction shown or of any other approved type though the specific sound box illustrated is well adapted for use in conjunction with my improved tone arm.

In furtherance of my present invention the ball 4 is preferably secured by a threaded collar 4' on the rear end of section 5 and I would have it understood that the said ball and its complementary socket 3 constitute important features of the invention.

Formed in the circumference of the ball 4 is a groove 7, Figs. 2 and 3, and disposed in said grooves are two ring sections 8, Fig. 3, having seats 9 at points about midway their length. These seats 9 are provided for the reception of the pivot points of set screws 10 that bear in and are carried by the wall of the socket 3. By virtue of this construction the tone arm portions or sections 2 and 5 are simply and strongly connected together, and this in such manner that the reproducer portions 5 and 6 are allowed to freely move upwardly and downwardly incidental to the motion of the record (not shown).

The connection between the section 5 and the sound box 6 plus the appurtenances of said mechanism also constitute important features of my present invention. The said connection and its appurtenances are clearly illustrated at the left of Fig. 2, and by reference to said figure it will be understood that the depending portion of the section 5 is shouldered and exteriorly threaded at 11. The sound box 6 is bored to snugly receive the depending portion of section 5 and to enable the sound box 6 to abut against the shoulder 10, and said sound box is also chambered for the reception of a lock nut 12 which is turned on the threaded end of the section 5. A steel washer 13 is arranged against the inner end of the chamber in the sound box, and an annular wave spring washer 14 is interposed between the lock nut 12 and said steel washer 13. This construction is calculated to take up lost motion and afford uniform friction while, the steel washer 13 is adapted to reduce the wear. It will also be noted that said construction as a whole renders it feasible to adapt the reproducer to either the hill and dale type of record or the laterally-waving groove type of record.

To limit the movement of the sound-box about the depending portion of the section 5, a stop slot 15 is cast in the top of the sound box and a stop pin 16 is carried in the end of the section 5, and so as to move in the said slot 15.

In Figs. 5 and 6 I illustrate parts comprised in my novel mechanism for raising the re-producer off of the record and swinging the same from above the record. Among other elements the said means com-

prises a segmental gear 18 fixed to the upright of the tone arm and adapted to travel with the re-producer toward the center of the record 19, Fig. 5. Disposed below and
 5 intermeshed with said segmental gear 18 is a sector shaped gear 20, Figs. 5 and 6. This latter gear is fixed on a shaft 21 which extends through a sleeve 22, pivoted at 23 to a hanger 24 that is fixed to the underside of
 10 a table 25. The shaft 21 also extends loosely through a slot 26 in a hanger 27, and is equipped near its outer end with a beveled gear 28. The said beveled gear 28 is intermeshed with a gear 29 on an upright
 15 vertically-movable shaft 30. This shaft 30 has studs 32, disposed in vertical slots in a revoluble member 31 journaled and secured in a bearing 34 in the table. A swinging handle 33 is pivoted in the member 31 and
 20 provided with a cam head at its lower end arranged to engage the upper end of the shaft 30. Thus when said handle is swung from the position shown in Fig. 5 to a horizontal position, the shaft 30 and the entire
 25 arm of the shaft 21 will be depressed while the inner arm of said shaft 21 and the gear 20 will be raised with the result that the tone arm and the sound box will be raised to carry the latter clear of the record. Then
 30 when the handle 33 is swung horizontally, the tone arm and the sound box will be swung over the record and table.

It will also be noted that by reversing the horizontal movement of the handle 33 and
 35 then restoring the same to the upright position illustrated in Fig. 5 the sound box and its appurtenances may be replaced in the working position shown in Fig. 5.

The stop lugs 40 on the section 5 serve
 40 by bringing up against the end of section 2 to prevent the reproducer from falling when the tone arm and reproducer are lifted off the record.

That portion 41 of shaft 30 below the gear
 45 27 is adapted by bearing on shaft 21 to keep the gears 29—28 from meshing too hard.

Having described my invention, what I

claim and desire to secure by Letters-Patent, is:

1. The combination of a tone arm having
 50 an upright portion, a gear on said upright portion, a shaft having a gear intermeshed with the first-named gear, a handle, and a connection intermediate the handle and the shaft for actuating the latter by the former. 55

2. The combination of a tone arm having
 a movable upright portion, a segmental gear fixed to said portion, a gear disposed under and intermeshed with the said segmental
 60 gear, a shaft carrying the second-named gear, a gear on said shaft, an upright shaft having a gear intermeshed with the last-named gear on the shaft, and a handle connected with and adapted to actuate the second-named shaft. 65

3. The combination of a vertically-mov-
 able and horizontally-swinging tone arm, a vertically swinging and horizontally mov-
 70 able handle, and means intermediate the handle and the tone arm, constructed and arranged to move the tone arm vertically on vertical movement of the handle and to swing the tone arm horizontally on horizon-
 tal movement of the handle.

4. The combination of a vertically-mov-
 75 able and horizontally-swinging tone arm, a gear thereon, a rotatable and vertically-mov-able shaft, a gear thereon and disposed under and in engagement with the first-named gear, a vertically-movable shaft,
 80 gearing between the said shafts, a revoluble member receiving and adapted to permit of independent vertical movement of the vertical shaft, and a lever pivoted on the revoluble member and constructed and arranged
 85 when depressed to depress the vertical shaft.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ZENA ECKLEBARGER.

Witnesses:

L. BURR WHIPPY,
 ANTHONY DEAHL.

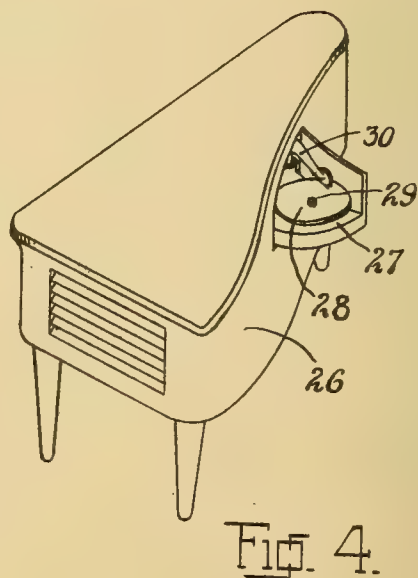
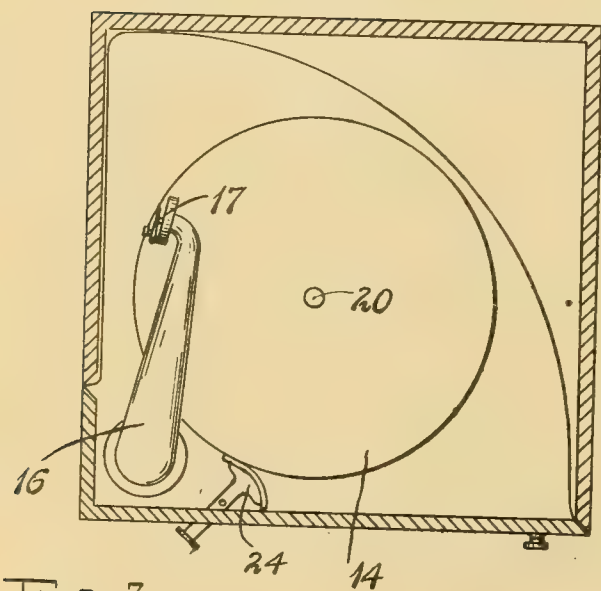
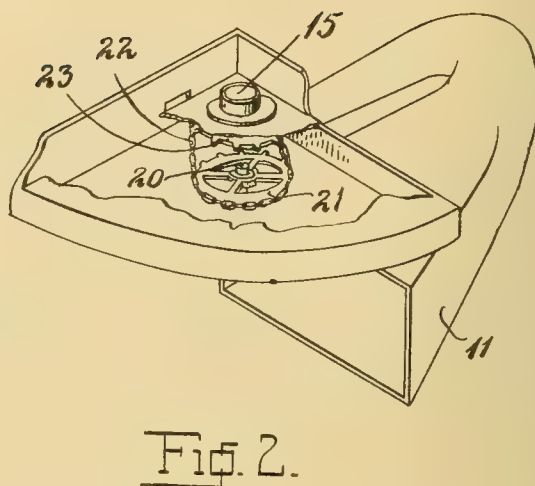
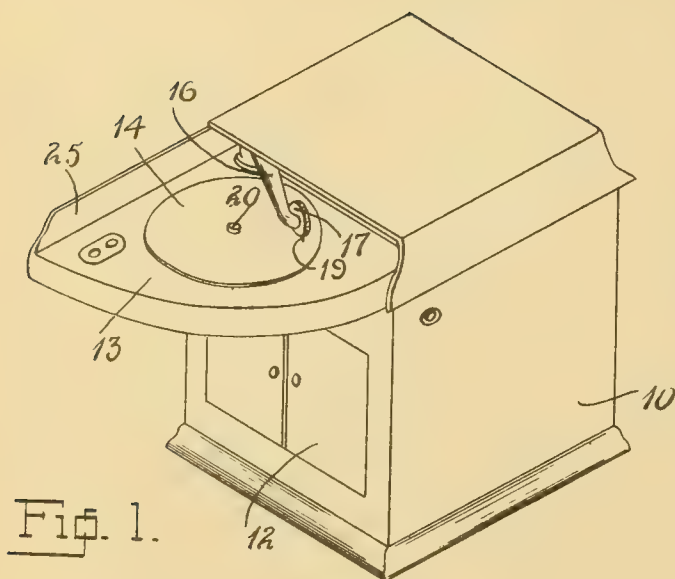
PHONOGRAPH.

1,269,536 ---- S. J. Hoexter,
Filed June 21, 1916,
Patented June 11, 1918.

S. J. HOEXTER.
 PHONOGRAPH.
 APPLICATION FILED JUNE 21, 1916.

1,269,536.

Patented June 11, 1918.



Samuel J. Hoexter, Inventor

By his Attorneys

Knight Bros

UNITED STATES PATENT OFFICE.

SAMUEL J. HOEXTER, OF KALAMAZOO, MICHIGAN.

PHONOGRAPH.

1,269,536.

Specification of Letters Patent.

Patented June 11, 1918.

Application filed June 21, 1916. Serial No. 104,950.

To all whom it may concern:

Be it known that I, SAMUEL J. HOEXTER, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, and State of Michigan, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

My invention relates in general to phonograph construction for disk machines and has for its object to provide a more convenient construction of the phonograph housing and the mounting of the operating parts. The improvement resides essentially in the arrangement of a record support and reproducer arm so as to be movable in unison into and out of the main housing in a horizontal plane, while retaining the proper connection of the driving mechanism with the record support. To this end, the record support and reproducer arm are for example pivoted upon a vertical axis which is parallel with the turn table axis but outside of the periphery of the turn table, the relation of the reproducer and the record therefore remaining unchanged throughout this movement from one position to the other. In this way the record receiving part is made accessible without having to raise the housing top or cover. The driving gear is connected from the turn table axis to the axis of the record support and reproducer arm through any suitable elements so that the relation of the power shaft to the driven part remains constant. The principle of the invention may be carried out in a multiple form so that a plurality of reproducing outfits are associated within a single main housing, to permit the successive or simultaneous reproduction of a plurality of associated selections as for example in the case of operatic music exceeding the capacity of the single record, or in combining two or more reproductions simultaneously.

The invention is illustrated by way of example in the accompanying drawings in which—

Figure 1 is a perspective view of a simple embodiment of the invention with the reproducing elements exposed for access,

Fig. 2 is a similar view showing an ex-

ample of the driving gear and the amplifier arrangement,

Fig. 3 is a horizontal section of the device shown in Fig. 1, taken just beneath the cover.

Fig. 4 is a perspective view of a somewhat different design of housing embodying the invention.

Referring to Figs. 1, 2 and 3, 10 indicates the main housing which contains the amplifier or sound horn 11 having its orifice adjacent the doors 12 of usual construction. A supporting platform 13 for the turn table or record support 14 is pivoted in the main housing upon an axis concentric with the tube 15 upon which the reproducer arm 16 is pivotally mounted. The reproducer arm 16 carries a reproducer head 17 which may be of any approved construction and which may be provided with a needle 19 to trace the record groove formed in the disk record mounted on the turn table 14. The turn table shaft 20 has fixed upon it a sprocket wheel 21 engaged by a chain 22 which is driven by a sprocket wheel 23 to which the motive power in any approved form is applied. The axis of sprocket wheel 23 coincides with the center of tube 15 and is common to both the sprocket wheel 23 and the turn table support 13 so that a fixed relation between the driving and the driven parts is always maintained. The turn table 14 may be engaged and arrested by any ordinary form of brake such as shown at 24, this brake being carried by the turn table support 13 and having its operating lever projecting through a wall section 25 which is fixed to the turn table support 13 and completes the inclosure of the housing of the reproducing chamber when closed.

Fig. 4 illustrates the same principle applied to a different style of cabinet 26. In this example the turn table support 27 has mounted upon it as before the turn table 28 whose shaft 29 is assumed to be driven in the manner already illustrated. The support 27 is pivoted upon an axis which is concentric with the tubular support of the reproducer arm 30 as already shown in Fig. 2.

The invention in its broad aspect com-

prises any arrangement by which at least the record support and preferably also the reproducer arm may be introduced into and withdrawn from the main housing, and this
5 movement is preferably effected in a horizontal plane.

I claim:

A phonograph comprising in combina-

tion a main housing, a disk record support, and driving mechanism for said support 10 having an element operating upon a stationary axis at a fixed distance from the record support axis, and means for moving said record support about said stationary axis into and out of said housing.

SAMUEL J. HOEXTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

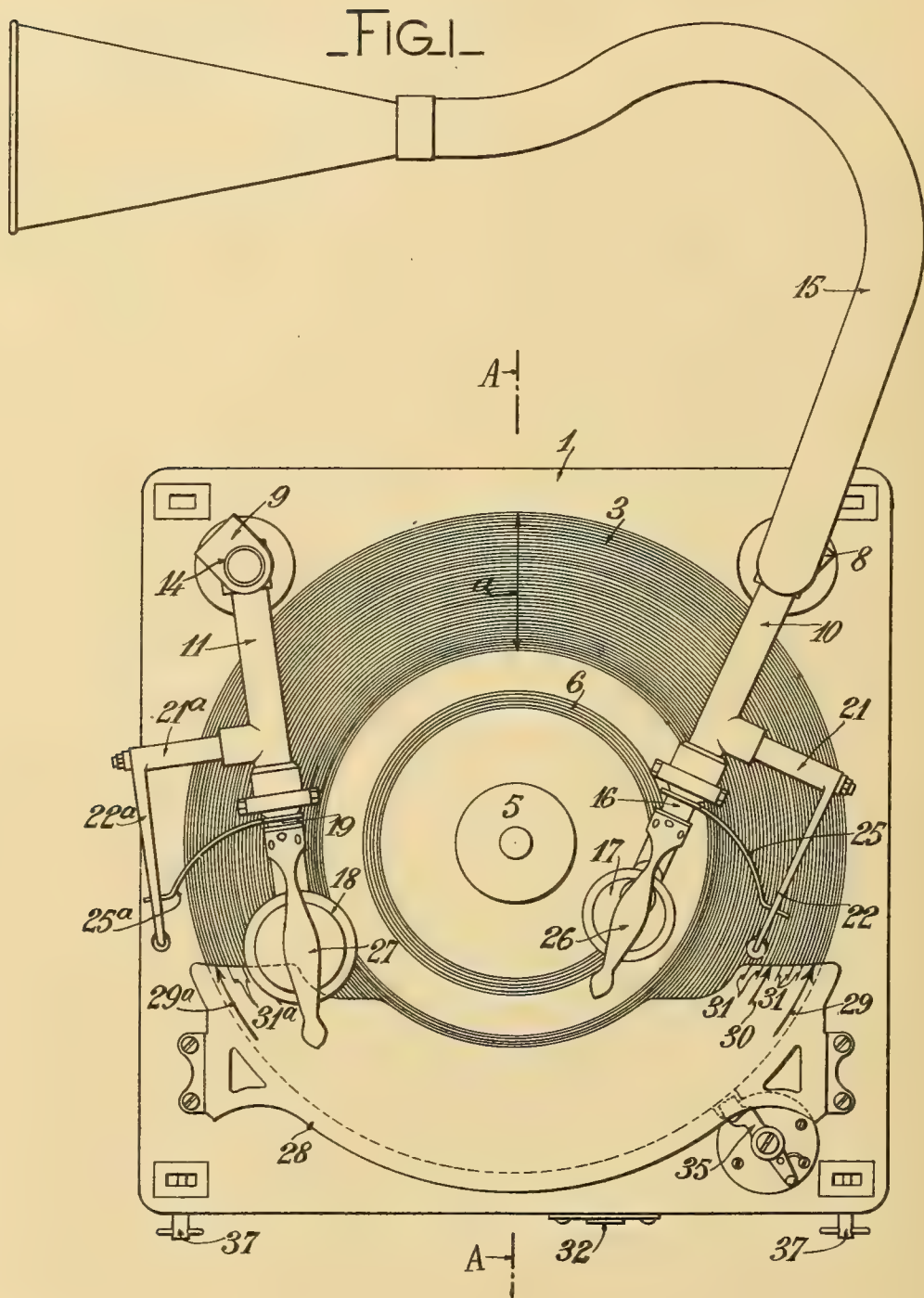
RECORDING AND REPRODUCING PHONOGRAPH.

1,269,607 ----- E. A. Ivatts,
Filed Feb. 10, 1914,
Patented June 18, 1918.

E. A. IVATTS.
RECORDING AND REPRODUCING PHONOGRAPH.
APPLICATION FILED FEB. 10, 1914.

1,269,607.

Patented June 18, 1918.
6 SHEETS—SHEET 1.



Witnesses:
Charles Francis R.
Judith Pardee

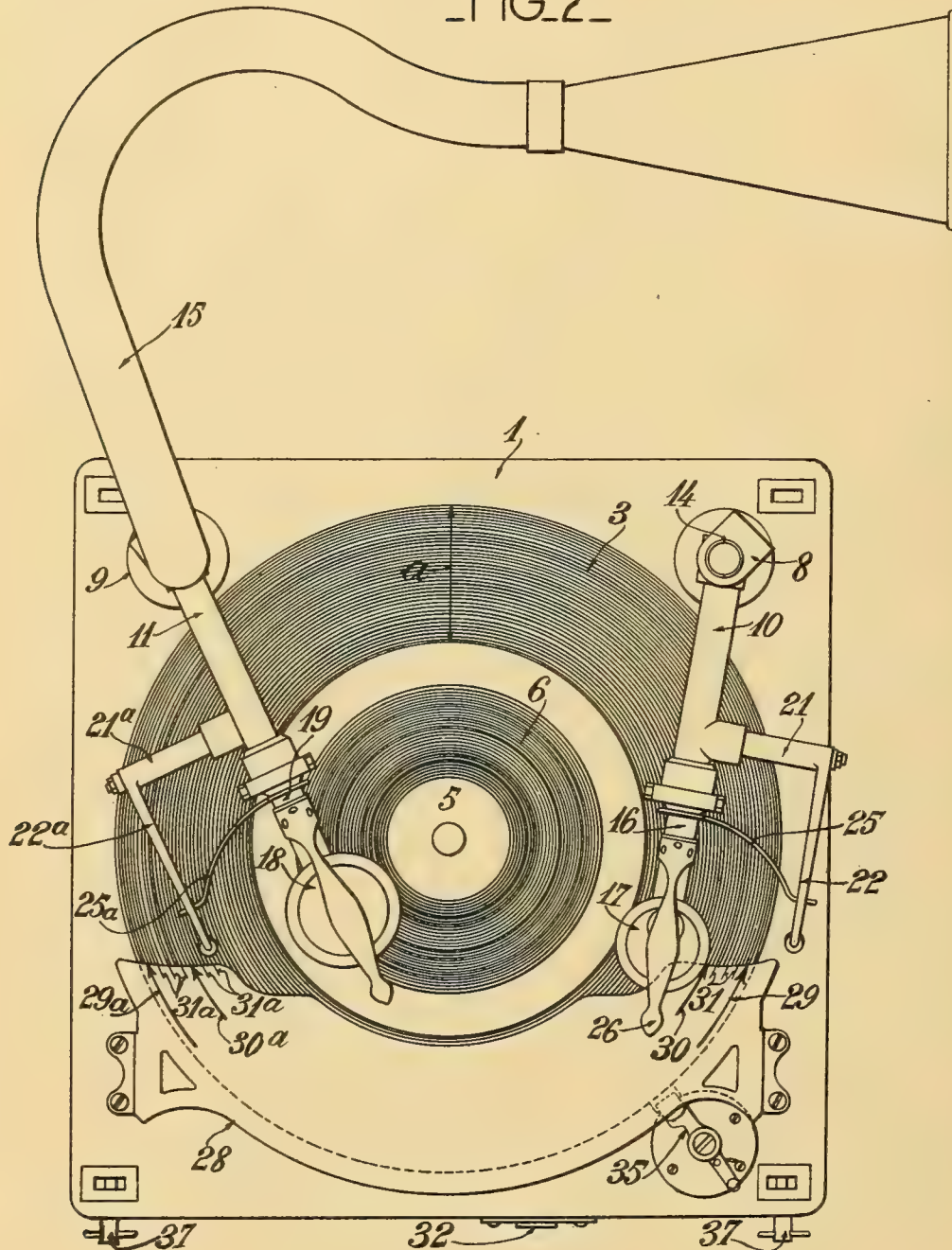
Inventor
Ernest Albert Ivatts
by Ottomars
his Attorney

E. A. IVATTS.
RECORDING AND REPRODUCING PHONOGRAPH.
APPLICATION FILED FEB. 10, 1914.

1,269,607.

Patented June 18, 1918.
6 SHEETS—SHEET 2.

FIG. 2



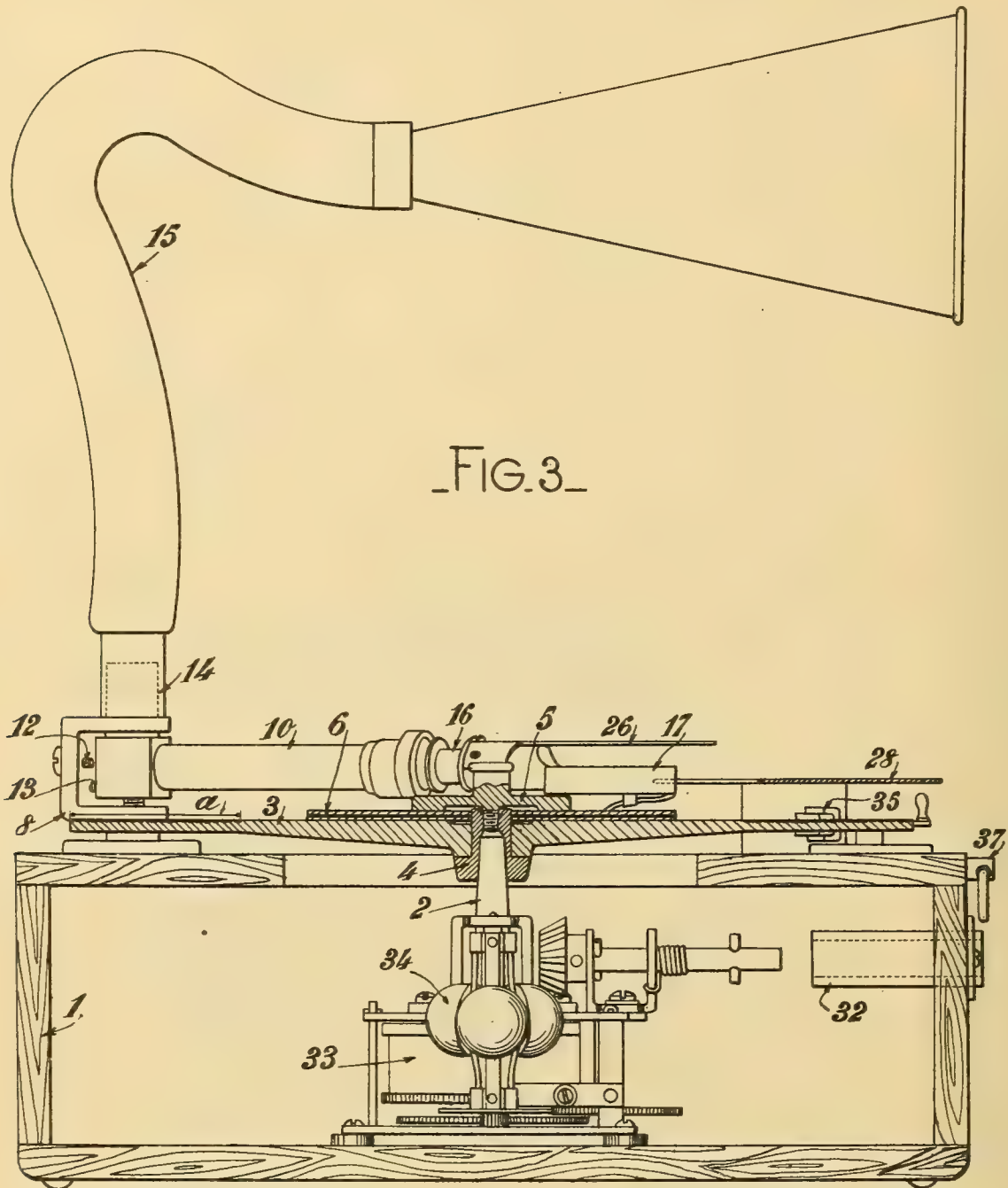
Witnesses:
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E. A. IVATTS.
RECORDING AND REPRODUCING PHONOGRAPH.
APPLICATION FILED FEB. 10, 1914.

1,269,607.

Patented June 18, 1918.
6 SHEETS—SHEET 3.



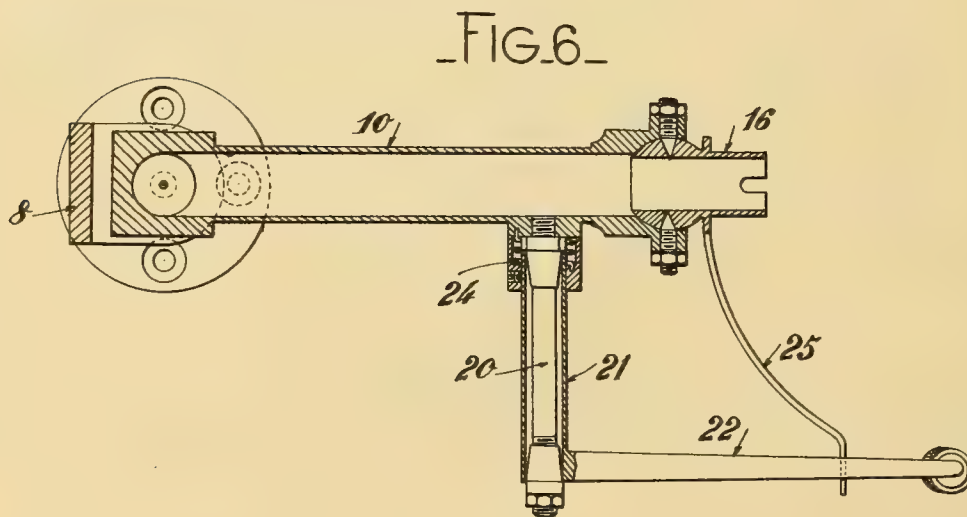
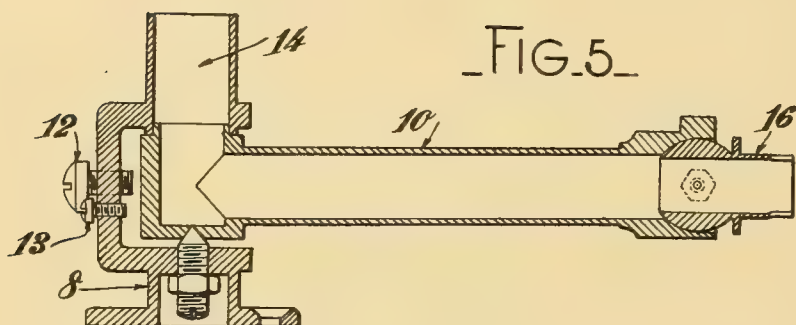
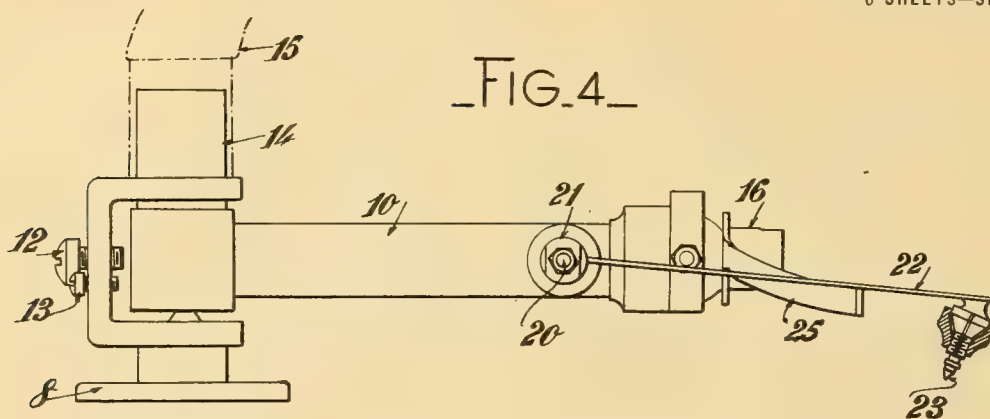
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Inventor
Ernest Albert Ivatts
by *Attorney*
his Attorney

E. A. IVATTS.
RECORDING AND REPRODUCING PHONOGRAPH.
APPLICATION FILED FEB. 10, 1914.

1,269,607.

Patented June 18, 1918.
6 SHEETS—SHEET 4.



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his Attorney

E. A. IVATTS.
RECORDING AND REPRODUCING PHONOGRAPH.
APPLICATION FILED FEB. 10, 1914.

1,269,607.

Patented June 18, 1918.
6 SHEETS—SHEET 5.

FIG. 7

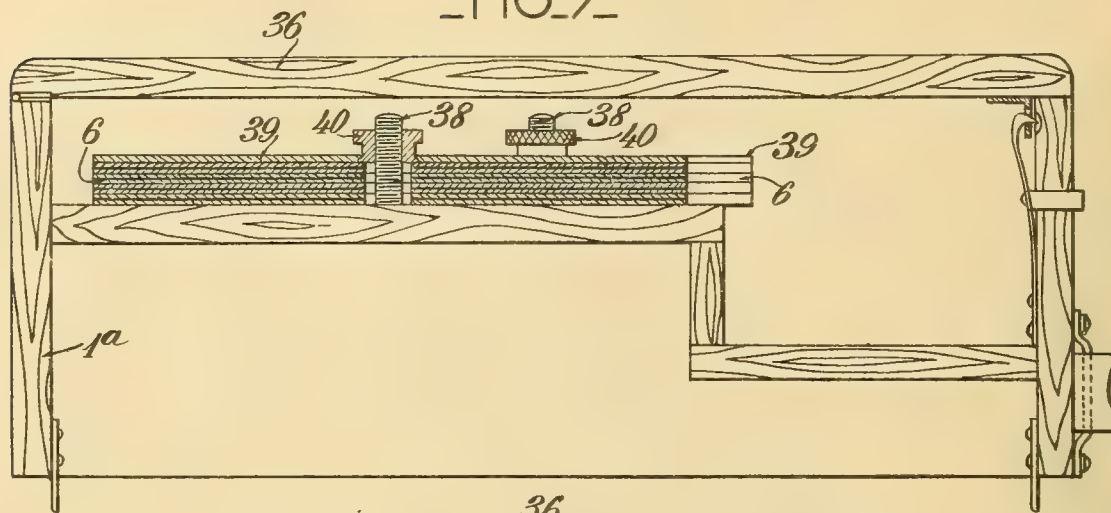
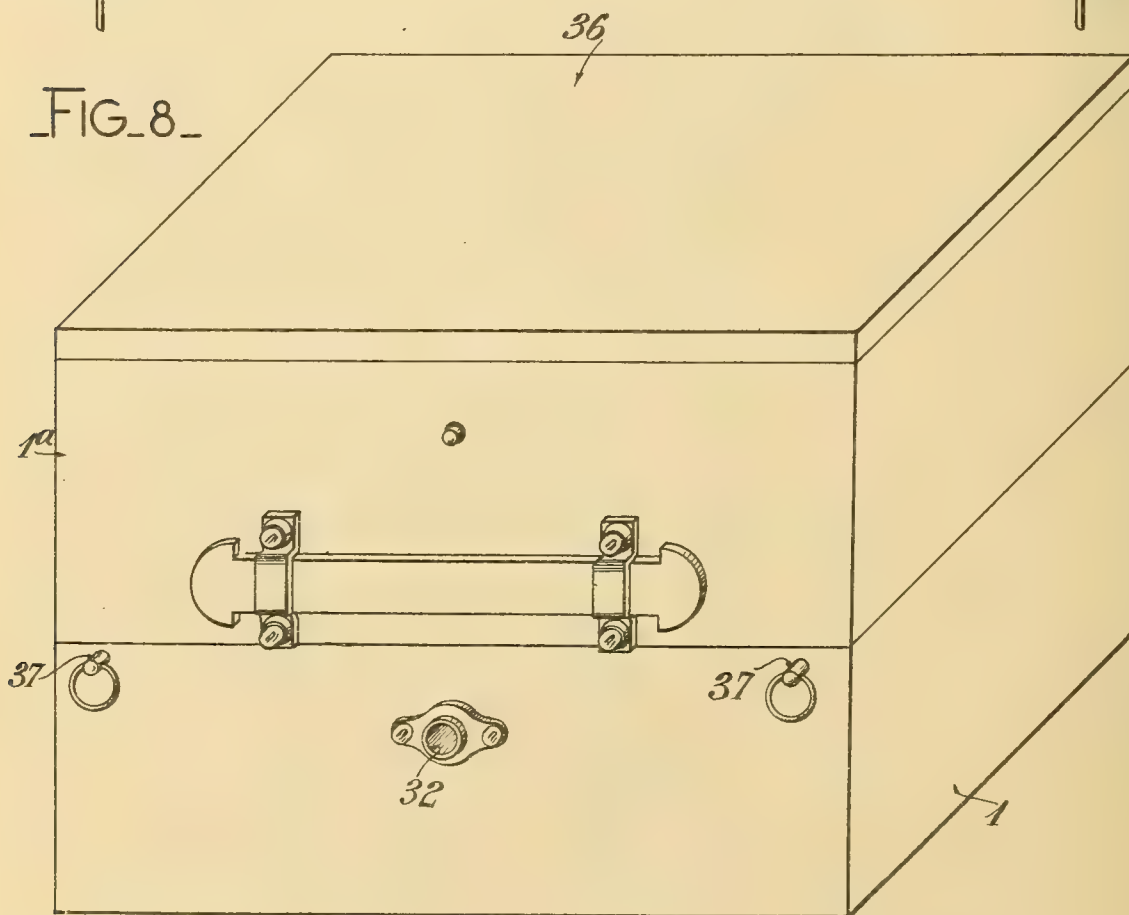


FIG. 8



Witnesses:
C. L. L. L. L.
J. L. L. L.

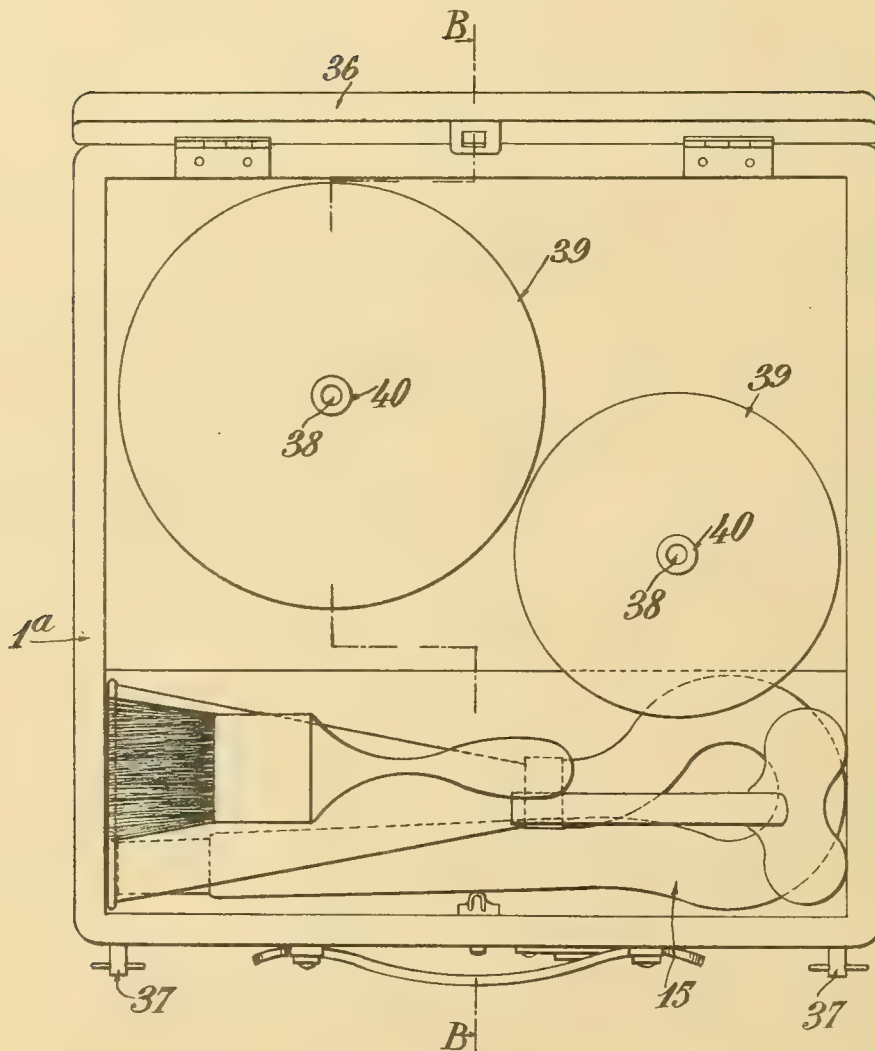
Inventor
Ernest Albert Ivatts
by O. L. L. L.
his Attorney

E. A. IVATTS.
 RECORDING AND REPRODUCING PHONOGRAPH.
 APPLICATION FILED FEB. 10, 1914.

1,269,607.

Patented June 18, 1918.
 6 SHEETS—SHEET 6.

FIG. 9.



Witnesses:
 LeCarrie Frank R
 Judith Parde

Inventor
 Ernest Albert Ivatts
 by Ottomunx
 his Attorney

UNITED STATES PATENT OFFICE.

ERNEST ALBERT IVATTS, OF PARIS, FRANCE, ASSIGNOR TO COMPAGNIE GÉNÉRALE DES ÉTABLISSEMENTS PATHÉ FRÈRES, PHONOGRAPHE ET CINÉMATOGRAPHE, OF PARIS, FRANCE.

RECORDING AND REPRODUCING PHONOGRAPH.

1,269,607.

Specification of Letters Patent.

Patented June 18, 1918.

Application filed February 10, 1914. Serial No. 817,724.

To all whom it may concern:

Be it known that I, ERNEST ALBERT IVATTS, a subject of the King of Great Britain, residing at 30 Boulevard des Italiens, Paris, in the Republic of France, have invented new and useful Improvements in Recording and Reproducing Phonographs, of which the following is a specification.

This invention has for its object a phonographic apparatus more particularly intended for postal correspondence, ordinary letters being replaced by phonographic disks which are recorded and sent through the post to the correspondent who hears upon his apparatus the phonic reproduction of the correspondence recorded on the disk.

In view of the special purpose for which it is more particularly intended, the novel apparatus is constructed in such a manner that it is at once possible by very simple means, either to record for dictating a letter, or to reproduce the sounds recorded for the purpose of reading over that which has been dictated, or to "read" the letter-disk received through the post. This result is obtained without the employment of any complicated mechanism owing to the fact that no nut and screw mechanism is employed for driving the recording and reproducing diaphragms, a method of driving already known *per se* being employed; this consists in providing the sound arm carrying the diaphragm with a guiding point which moves in a spiral groove formed upon a guide plate concentric with the disk over which the usual stylus of the recording or reproducing diaphragm is displaced.

According to the invention the apparatus comprises two independent sound arms which respectively carry the recording sound box and the reproducing sound box, these two sound arms being guided by the spiral groove of one and the same guide plate. This combination of two sound boxes, one for recording and the other for reproducing, with a single guide plate capable of displacing both of them with their sound arms in accordance with an angular translatory movement for producing the record and the reproduction, has great advantages as will be readily understood, because it allows of obtaining a recording and reproducing apparatus which is of exceedingly simple construction and is very compact and in which the number of elements is reduced to the strict minimum.

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The novel apparatus is also characterized by the combination with the two sound arms carrying the recording and reproducing sound boxes and the single guide plate the spiral groove of which controls the two sound arms of a special phonic disk constituted by a core of cardboard, paper or analogous material covered on its two faces with a layer of wax or suitable composition for receiving the record. For the purposes of correspondence, this phonic disk has the advantage that it can be transmitted through the post without taking special precautions and without risk of damage so that its employment in combination with the device described above renders it possible to utilize the apparatus under the best conditions for the special object in view, that is to say for correspondence.

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The apparatus has further characteristics as will appear from the following description.

The invention is illustrated by way of example in the accompanying drawings in which:

Figure 1 is a plan of the apparatus showing the position of the parts during recording.

Fig. 2 shows the position of the parts during reproduction.

Fig. 3 is a vertical section on the line A—A in Fig. 1.

Fig. 4 is an elevation of a sound arm.

Fig. 5 is a vertical section thereof.

Fig. 6 is a horizontal section thereof.

Fig. 7 is a partial vertical section on the line B—B in Fig. 9.

Fig. 8 is a perspective view of the case containing the complete apparatus in the constructional form illustrated by way of example.

Fig. 9 is a plan view with the lid of the apparatus raised.

The apparatus represented by way of example comprises a case 1 inclosing the operating mechanism which may be of any convenient kind and comprise a spring motor or an electric motor for example. This mechanism drives the vertical shaft 2 (Fig. 3) upon which a plate 3 of ebonite or the

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like is mounted. This plate may be provided at its center with a metal sleeve 4 into which is screwed a threaded nipple integral with a small plate 5 serving for fixing upon the plate 3 the disk 6 which is to be recorded or utilized for reproduction. As stated above, this disk 6 is composed of a core of paper, cardboard or the like, covered on both its faces with wax or some similar and usual composition. In proximity to its edge on the portion *a* the plate 3 is provided with a spiral furrow or groove, the path of which corresponds with that which the groove recorded on the disk 6 is to have. The disk 6 consequently covers the central portion of the plate 3 within the annular zone *a* carrying the spiral furrow.

Two supports 8, 9 are fixed on the case 1 and the two independent sound arms 10, 11 are able to rotate freely in these supports. The pivotal movement of these arms is limited by screws 12, 13 (Figs. 4 and 5). Each support 8, 9 ends at its upper part in a conduit 14 which communicates below with the inner conduit of the pivotal sound arm and is adapted to receive the extremity of the sound tube 15 serving for recording and reproducing. The sound tube is thus supported independently of the sound arm which is consequently relieved of the weight of the tube. If desired, this tube may be replaced by a horn or trumpet.

The free extremity of the sound arm 10 carries a socket 16 which can turn around a horizontal axis and upon which is fixed the recording sound box 17 provided with the usual recording sapphire. Similarly the arm 11 carries a socket 19 supporting the reproducing sound box 18. The arm 10 also carries a horizontal spindle 20 (Fig. 6) which is perpendicular to it and around which a tube 21 can pivot; this tube is integral with an arm 22 carrying at its extremity the guiding point 23 intended to move in the groove in the guide plate 3 in such a manner that under the action of this groove, it imparts an angular movement of translation to the recording sapphire. A small spiral spring 24 constantly depresses the arm 22, thus causing the point 23 to rest in the groove. A finger 25 integral with the socket 16 contacts with the arm 22 when the diaphragm is raised and lifts it so as to separate the point 23 from the plate 3. A similar arrangement is adopted for the sound arm 11. 21^a, 22^a, and 25^a indicate the parts respectively corresponding to the parts 21, 22 and 25. Each of the sound boxes 17 and 18 carries a small handle or finger 26 or 27 for conveniently raising it and these fingers bear the respective inscriptions "Recorder" and "Reproducer."

A plate 28 having the shape of an arc of a circle is fixed to the top of the case 1 by its bent extremities; this plate is sufficiently

raised above the case to permit of the plate 3 passing beneath it. The extremities of this plate are marked with arrows 29, 29^a, 30 and 30^a. When the guide point 23 of the recording sound box is opposite the arrow 29, the sapphire of the diaphragm is located in proximity to the outer edge of the disk 6, that is to say in the proper position for commencing to record. The recording sound box is preferably stopped automatically at this point when its sound arm is swung outward owing to the fact that it then strikes against the edge of the plate 28. In reproducing, the guide point of the reproducing sound box is similarly brought opposite the arrow 29^a at the other extremity of the plate 28. In this position the reproducing sound box is also able to strike against the said plate. The arrows 30, 30^a serve for disks 3 of diameter represented, that is to say a diameter smaller than that which has just been considered. The divisions 31, 31^a permit of bringing the diaphragms to given points on the disk 3 without trial or hesitation.

In order to render one of the sound boxes inoperative, it is merely necessary to bring its edge upon the plate 28. The method of using the apparatus will be obvious from the foregoing description. In order to make a record, the disk 6 is placed upon the plate 3 and the mechanism is started; the recording sound box is then brought into position upon the disk 6 its guide point being opposite the appropriate arrow 29 or 30. The depression of the diaphragm onto the disk produces the simultaneous depression of the point 23 onto the plate 3 by the action of the spring 24 so that a single movement is sufficient to cause the diaphragm and the guide point to assume the operative position. It is thus only necessary to talk into the trumpet of the sound tube 15 which has been connected with the support 8. The reproducing sound box has been rendered inoperative in the manner indicated above. During the making of the record, the recording sapphire guided by the point 23 which moves in the groove of the plate 3 describes an arc of a circle around the axis of the support 8 while approaching the center of the apparatus. If it be desired to read over that which has been dictated in the manner described the recording sound box is rendered inoperative, the sound tube 15 is replaced on the support 9 (Fig. 2) and the reproducing sound box is brought into action. On receiving the letter-disk the recipient places it upon his apparatus and proceeds in the manner last described. It is therefore apparent that the operations to be effected are exceedingly simple.

The control mechanism of the apparatus which is represented in Fig. 3 presents no peculiarity. 32 designates a socket in which the end of the winding handle is engaged.

33 designates the spring barrel and 34 is the ball governor. The usual brake 35 is mounted on the upper part of the case 1.

The apparatus represented is essentially portable. It consists of two parts: the lower part constituted by the case 1 and the upper part constituted by a case 1^a provided with a lid 36. During transport the two cases are united by means of bolts 37. The upper case 1^a contains two threaded rods 38 upon which a certain number of disks of two different diameters can be passed. These disks are held in place by metal plates 39 integral with nuts 40 which are screwed on the rods 38. A deeper portion of the upper case 1^a contains the sound tube 15 and the small accessories. Fig. 8 shows that the complete apparatus is exceedingly compact and readily transportable. This constructional form of the apparatus is particularly suited for commercial travelers for example as the use of the apparatus will dispense them from the necessity of writing their correspondence.

It will of course be understood that the invention is not limited to the construction here described and illustrated. In particular, the two supports 8, 9 might be located at diametrically opposite points of the case 1 and similarly the upper case 1^a might be replaced by a flat cover; in this instance the case 1 would be integral with compartments located laterally of the said case and in which the disks and accessories would be kept.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a recording and reproducing phonograph: a recording sound box, a reproducing sound box, a guide plate having a spiral groove, means for rotating said guide plate,

sound arms upon which the recording and the reproducing sound boxes are respectively mounted so as to be capable of swinging vertically, supports upon which the sound arms may swing freely, guiding points mounted on the sound arms, respectively, and adapted to swing vertically on the same, means for forcing the guiding points downwardly in contact with the spiral groove on the guide plate, a member moving with each of the sound boxes and adapted to remove the corresponding guiding point, from the spiral groove when the sound box is brought to the inoperative position and means for supporting the sound boxes in inoperative position, substantially as described and for the purpose set forth.

2. In a recording and reproducing phonograph: a recording sound box, a reproducing sound box, a guide plate having a spiral groove; means for rotating said guide plate, sound arms carrying the recording sound box and the reproducing sound box, respectively, supports upon which the sound arms may swing freely, guiding points mounted on the sound arms, respectively, and adapted to swing vertically on the same so as to engage with the spiral groove or to be removed therefrom and means for supporting the sound boxes in inoperative position with respect to the phonographic disk, said means embodying an arc shaped plate provided with marks at its ends, substantially as described and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST ALBERT IVATTS.

Witnesses:

ANTOINE LAVOIE,
CHAS P. PRESSLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."



SOUND BOX FOR PHONOGRAPHS.

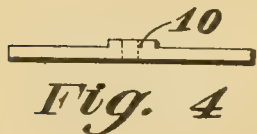
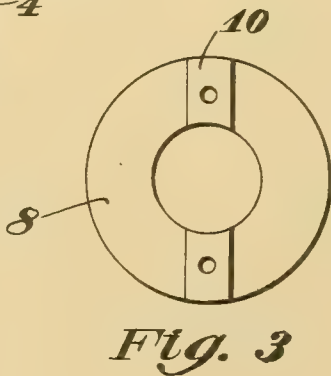
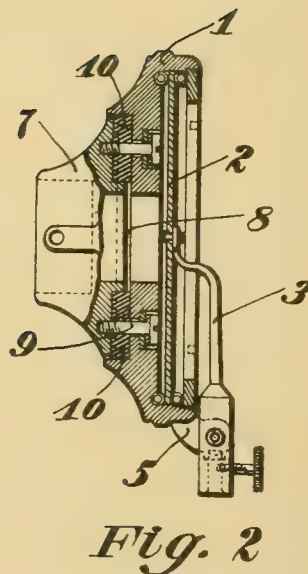
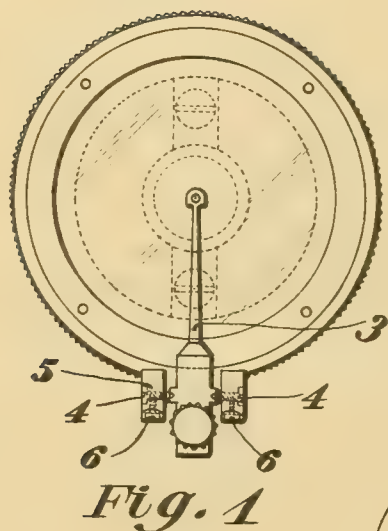
1,269,659 ----- C. P. Trundy,

Filed July 12, 1917,
Patented June 18, 1918.

C. P. TRUNDY.
SOUND BOX FOR PHONOGRAPHS.
APPLICATION FILED JULY 12, 1917.

1,269,659.

Patented June 18, 1918.



Witness
Lorenzo Albarte.

Inventor
Charles P. Trundy
By his attorneys
Van Curen Fish & McIlwain

UNITED STATES PATENT OFFICE.

CHARLES P. TRUNDY, OF BOSTON, MASSACHUSETTS.

SOUND-BOX FOR PHONOGRAPHS.

1,269,639.

Specification of Letters Patent.

Patented June 18, 1918.

Application filed July 12, 1917. Serial No. 180,114.

To all whom it may concern:

Be it known that I, CHARLES P. TRUNDY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sound-Boxes for Phonographs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improvement in sound boxes for phonographs.

The object of the present invention is to reorganize and improve the construction of sound boxes for phonographs in general and especially in the direction of preventing undesirable vibrations from being transmitted from the needle to the tone arm. To the above ends the present invention consists of the sound box hereinafter described and particularly defined in the claims.

In the accompanying drawings illustrating the preferred form of the invention, Figure 1 is a front elevation of the sound box; Fig. 2 is a sectional elevation, taken at right angles to Fig. 1; Fig. 3 is a plan view of the rubber disk, and Fig. 4 is an elevation of the same.

The sound box 1 is provided with a diaphragm 2, needle arm 3, and the like, which, except as hereinafter pointed out, are of any usual or preferred construction. The needle arm is pivoted upon the pivot screws 4 which are supported in the ears 5, projecting from the sides of the sound box. These pivot screws are secured in place by set screws 6, so that when they are adjusted to correct position they may be secured in place and are not liable to be loosened by heavy vibration. The heads of the set screws 6 are received in depressions or cavities in bosses projecting from the sides of the ears 5 so that they are not liable to engage any object with which they might come in contact, or to be disturbed by the user because they are so concealed and inconspicuous. At the rear of the sound box 1 there is a depression or cavity which is cylindrical in form, and receives the sound box end of the tone arm sleeve 7. Between the sound box and the tone arm sleeve is received the rubber disk 8, which is interposed between the tone box and the tone arm sleeve for the purpose of preventing the transmission of vibration from the one to the other. Vibrations set up in the sound box

by the engagement of the needle with the record are thus prevented from being transmitted to the tone arm sleeve, and thence to the tone arm, and are therefore suppressed or destroyed. The tone arm sleeve is secured to the sound box by means of screws 9, two of such screws being used, one above and the other below the center of the sound box. The screws 9 pass through the bottom of the sound box, through the rubber disk 8, and are screwed into the tone arm sleeve. Under the heads of the screws are provided metal washers in the first place, which come in contact with the heads of the screws, which metal washers take against the rubber washers, which in turn rest on the bottom of the screw head cavities in the sound box. It is common in this art to interpose an elastic ring between the sound box and the tone arm for the purpose of dissipating the vibrations communicated to the sound box by the diaphragm and thus reduce to a minimum the transmission of such vibrations to the tone arm. In these prior devices, however, the connection between the sound box and the tone arm has been such that pressure on the interposed elastic ring or disk is uniform throughout the annular point of contact, and, in view of this fact and the further fact that it is imperative that the sound box shall be connected firmly to the tone arm, it is impossible to keep the vibrations of the sound box from being transmitted in a large measure to the tone arm. An ideal condition would probably exist were it possible to have the construction such that all the vibrations would be taken up in the sound box structure, but this is impossible in view of the necessity for a fairly firm connection between the sound box and the tone arm. I have discovered a way of approaching this ideal construction by providing means whereby the vibrations of the sound box are dissipated almost entirely, while at the same time providing a connection between the sound box and the tone arm which will be amply rigid. One preferred way of doing this is to provide the elastic wing 8 at a point where it is penetrated by each of the screws 9 with the thickened portion 10, so that by the employment of two screws and two thickened portions arranged at diametrically-opposite points, as shown, the sound box is fastened firmly to the tone arm at these diametrically-opposite points, while at points between the screws there is very little

pressure on the body of the ring, thus providing one or two or more hard clamping points around the vibration-deadening ring and reducing the pressure to a minimum on the ring at intermediate points insures the vibrations of the sound box being in a large measure dissipated by being taken up or destroyed in the lightly-clamped parts of the ring.

In the above-described construction, there is believed to be a slight oscillation of the sound box parallel with the axis of the needle; this construction is therefore particularly adapted for use in connection with sound records in which the sound grooves are cut by a laterally vibrating recording stylus. In this case, the plane of the diaphragm of the reproducing sound box is placed parallel with the series of sound grooves, and it has been found empirically that the best results are obtained if the axis of oscillation of the sound box is parallel with the axis of the needle, although good results are obtained in eliminating undesirable vibrations in the tone arm where the axis of oscillation of the sound box is at right angles to the axis of the needle. But where sound records are used in which the sound grooves are cut by a vertically vibrating recording stylus, that is to say, on the "hill-and-dale" principle, the plane of the diaphragm of the reproducing sound box is transversely placed to the series of sound grooves so as to permit the lower end of the reproducing needle to rise and fall with the undulations of the sound grooves. It is apparent that in this latter case the axis of oscillation of the sound box must be parallel with the pivotal axis of the needle, otherwise, the sound box would not oscillate to take up the undesirable vibrations. But whether the sound grooves of the sound records are cut on the lateral principle or on the vertical principle, the present invention eliminates the undesirable vibrations in the tone arm by connecting the sound box with the tone arm sleeve in such manner that the sound box will be permitted to yieldingly oscillate with respect to the tone arm sleeve, thereby eliminating the communication of vibrations from the sound box itself to the tone arm. In the accompanying drawing the sound box is shown as oscillating on a vertical axis. It will be understood, however, that the invention is not limited to a sound box so mounted, but includes within its scope a sound box mounted to oscillate with respect to the tone arm sleeve, whatever the position of the axis of oscillation.

The feature hereinbefore referred to of pivoting the needle arm on the axis intersecting the axis of the needle arm is a useful feature of the invention which contributes measurably to its successful operation,

although other features of the invention may be used without it, if desired. Another feature which is of importance in this construction resides in that by virtue of which the rubber which connects the tone arm to the sound box is entirely covered by an annular projection from the tone arm sleeve into the recess in the sound box, so that the rubber is not exposed to the sound waves passing through the tone arm. It is well known that where the rubber is exposed to the sound waves it tends to absorb them and they are thereby transmitted in lesser intensity than where they are inclosed in a metallic arm like the usual tone arm. Thus the construction used of a tone arm having no rubber exposed to the sound waves is of advantage in producing a box of superior construction, and for more accurate reproduction of the sound waves from the record.

It will be observed that the screws 9 are inserted from the inside of the sound box, so that their heads will be inclosed and hidden by the diaphragm 2. Arranging the screws in this manner not only provides a neat and smooth and practically invisible connection with the tone arm, but also renders it impossible for the adjustment to be disturbed without first taking out the diaphragm, whereby the likelihood of the adjustment being disturbed after it is properly adjusted in the factory will be reduced to a minimum. With this construction, it will be seen that the ends of the screws may be terminated in the body of the tone arm, so that the surface of the tone arm may be entirely free from projections.

Having thus described the invention, what is claimed is:

1. A sound box for phonographs, having, in combination, a box having a bottom, a tone arm sleeve having a portion adapted to fit the bottom of the box, a rubber washer interposed between the tone arm sleeve and the sound box, and connections between the tone arm sleeve and the sound box, provision being made to positively insure a harder clamping action on the washer at two diametrically-opposite points than at the intermediate points thereof, for the purpose set forth.

2. A sound box for phonographs, having, in combination, a box, a tone arm sleeve, a washer having diametrically opposed thickened portions, and means for holding the tone arm on the sound box.

3. A sound box for phonographs, having, in combination, a sound box, a tone arm sleeve, a rubber disk having two diametrically opposed thickened portions, and fastening means passing through said thickened portions for holding the tone arm sleeve to the sound box, causing greater pressure to be exerted upon the thickened portions of the rubber disk.

4. A sound box for phonographs, having, in combination, a box, a tone arm sleeve, a washer interposed between the sleeve and box for holding the tone arm sleeve and box
5 together, said tone arm sleeve and box having provisions to cover the rubber disk between the two, and said washer having provision for positively insuring a harder clamping action on the washer at two diametrically-opposite points than at the inter-
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mediate points of the washer, for the purpose set forth.

5. In combination with the hub of a tone-arm, a sound-box, fastening screws inserted through the wall of the sound-box and having their threaded ends terminating in said hub, a diaphragm mounted in the sound-box so as to cover the screw-heads, and a needle-holder mounted on the sound-box. 15

CHARLES P. TRUNDY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

The first part of the book is devoted to a general introduction to the subject of the history of the English language. It discusses the various factors which have influenced the development of the language, and the different stages of its growth. The author also deals with the question of the origin of the English language, and the influence of other languages upon it.

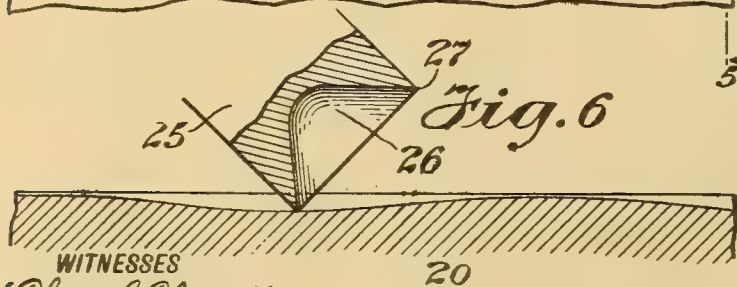
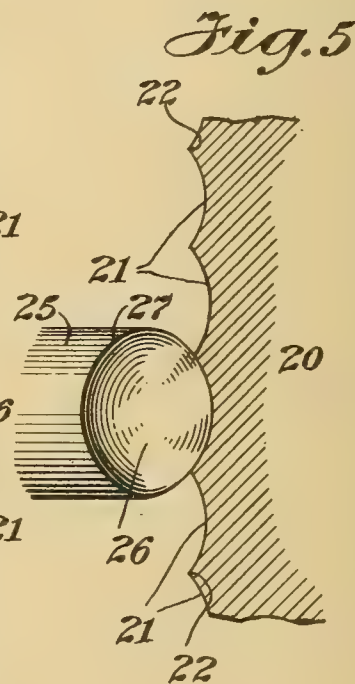
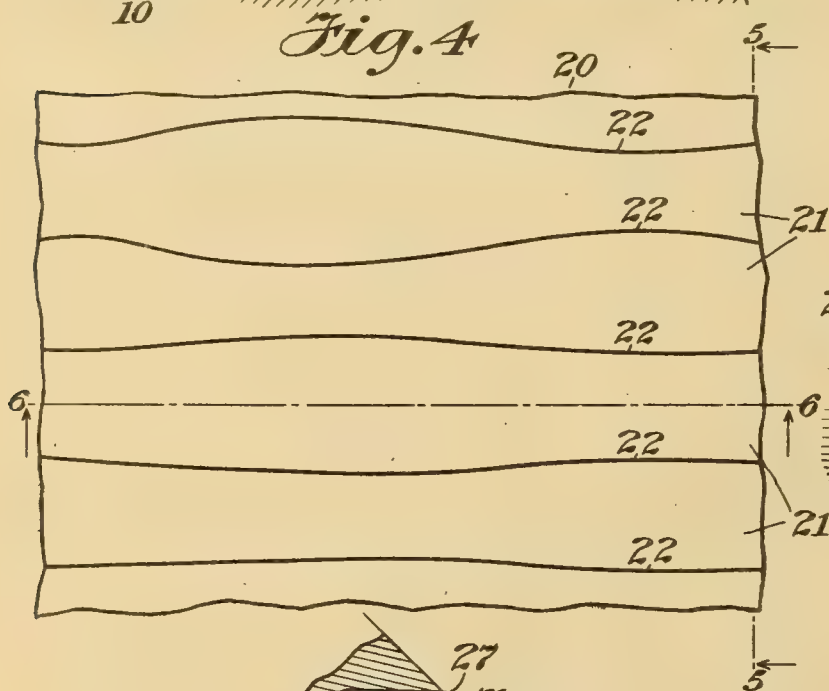
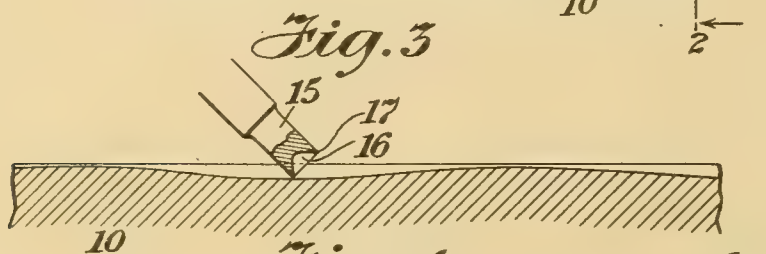
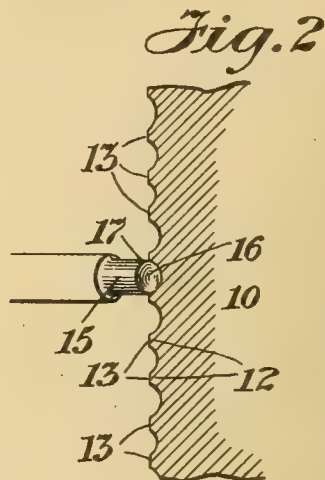
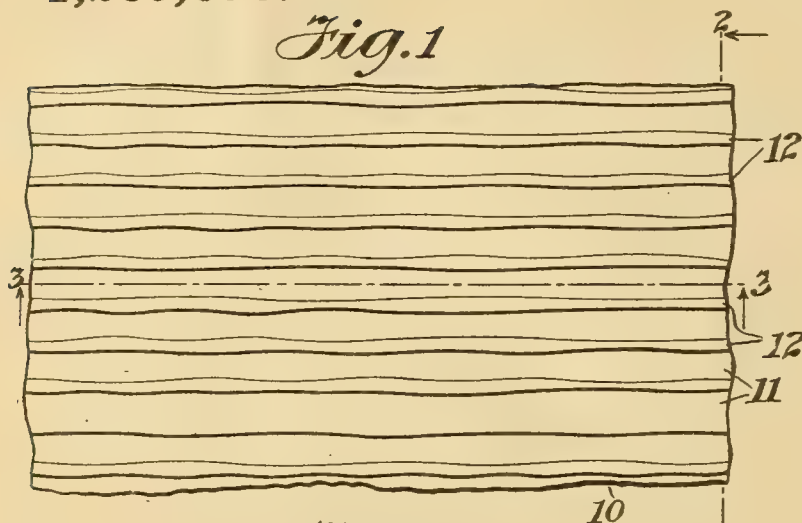
The second part of the book is devoted to a detailed study of the English language from the point of view of its grammar and vocabulary. It discusses the various parts of speech, and the different forms which they assume. It also deals with the question of the origin of the words of the English language, and the influence of other languages upon it.

SOUND RECORD.

1,269,696 ----- J. Fletcher,
Filed July 3, 1915,
Patented June 18, 1918.

1,269,696.

Patented June 18, 1918.



WITNESSES
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W. S. Orton

INVENTOR
John Fletcher
BY
A. J. Gardner
HIS ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN FLETCHER, OF DOUGLASTON, NEW YORK, ASSIGNOR TO OPERAPHONE MANUFACTURING CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SOUND-RECORD.

1,269,696.

Specification of Letters Patent. Patented June 18, 1918.

Application filed July 3, 1915. Serial No. 37,946.

To all whom it may concern:

Be it known that I, JOHN FLETCHER, a citizen of the United States, and a resident of Douglaston, Queens county, Long Island, State of New York, have invented certain new and useful Improvements in Sound-Records, of which the following is a specification.

It is well known that the sound records, or talking machine records, now in general use, are divided into two types or classes which are known respectively as the "hill and dale" or vertically undulatory type and the "zig zag" or laterally undulatory type. Records of the "hill and dale" type are usually provided in each case with an undulatory spiral groove of uneven depth forming "hill and dale" undulations corresponding to sound waves, and records of the "zig zag" type are usually provided in each case with an undulatory spiral groove of substantially uniform depth forming "zig zag" or lateral undulations corresponding to sound waves.

In the usual process of producing commercial records of either the "hill and dale" or the "zig zag" type, it is customary to first form a master record by cutting in a record blank of wax or other comparatively soft wax-like material a suitable spiral groove by means of a suitable cutting tool or stylus vibrated by and in accordance with sound waves. A matrix or negative is then made from the master record by an electrotyping process and the commercial records are then formed by subjecting normally comparatively hard record material, rendered temporarily plastic by heat, to the action of the matrix under great pressure, and then cooling the record material while under pressure.

It has been suggested that in recording "hill and dale" undulations in a record that the resistance to the action of the recording stylus varies with the depth of the groove being cut whereas in recording "zig zag" undulations there is no variation in resistance due to variation in depth of cut as the depth of cut is constant.

It has also been suggested that in reproducing sound from a "hill and dale" record the bottom wall of the record groove has to perform not only the function of support-

ing the weight of the sound box but also the function of vibrating the stylus and diaphragm and consequently is subjected to greater wear and must be considerably broader than the bottom of a "zig zag" record which is smooth and even and has to perform only the function of supporting the sound box.

Moreover, it has been suggested that the use of a wide sound groove in forming a record is considered to be objectionable in that it requires the removal or displacement of a relatively large amount of material from the wax master record, and consequently causes a considerable resistance to the normal action of the recording stylus during the recording process; and that it is also objectionable in that it diminishes the number of words or the amount of sound measured in time which may be recorded upon a given area of record.

Prior to this invention, to avoid a rapid wearing away of undulatory walls of "hill and dale" records it has been customary to provide such records with much broader spiral grooves than are usually provided in records of the "zig zag" type and in an obvious effort to economize space as much as possible the spiral grooves of such "hill and dale" records have been so formed that the successive convolutions of the groove "overlap" or meet in sharp edges, as will appear hereinafter.

This invention provides a "hill and dale" record, having an extremely narrow undulatory groove, which may be used successfully in coöperation with an ordinary conically pointed steel needle in reproducing sound, and which has been found to be extremely durable in use and to have practically all of the advantages of a "zig zag" record, and also certain other advantages, as will appear hereinafter.

In the accompanying drawings, Figure 1 is a greatly enlarged fragmentary top plan view of a disk sound record constructed in accordance with this invention; Fig. 2 a transverse section of the same on line 2—2 of Fig. 1; Fig. 3 a longitudinal section of the same on line 3—3 of Fig. 1; Fig. 4 a fragmentary top plan view of an old form of "hill and dale" sound record, drawn to substantially the same scale as Fig. 1; Fig.

5 a transverse section on line 5—5 of Fig. 4; and Fig. 6 a longitudinal section on line 6—6 of Fig. 4.

Referring to the drawings, one embodiment of this invention comprises a commercial disk sound record 10 formed in any well known or suitable manner of any usual or suitable material but preferably of a substantially homogeneous material or composition which is plastic when heated and hard when cooled and which contains a small amount of a finely pulverized mild abrasive such for instance as china clay or barytes, or any other suitable material. In the face of the disk record is formed in any well known or suitable manner a spiral groove 11 in the form of "vertical" or "hill and dale" undulations corresponding to sound waves. This sound groove may be of any suitable form and dimensions, but preferably in cross section is approximately or substantially in the form of a portion of an ellipse or slightly flattened semi-circle arranged with its longer or major diameter extending either in the plane of the face of the record or in a direction parallel thereto, depending upon the depth of the groove at the particular point where the cross section is taken. Ordinarily at its deepest points the groove 11 in cross section is approximately or substantially in the form of a semi-ellipse or slightly flattened semi-circle and is slightly more than twice as wide as it is deep, but it is to be understood that this ratio between the maximum width and the maximum depth of groove may be either increased or decreased as may be found desirable, and in some cases it may be found desirable to have the maximum depth of the groove as great or even greater than the maximum width of the groove. In any case, however, the maximum width of the groove is preferably slightly less than the pitch of the spiral or the distance from the center of one convolution of the spiral to the center of a succeeding convolution, thus leaving at all times a spiral wall 12 having a flat top or outer surface 13 of appreciable width between successive convolutions.

In the embodiment of this invention shown in Figs. 1, 2 and 3, the spiral record groove has 184 turns or convolutions to the inch, or in other words, the "pitch" of the groove is 1/184 of an inch (approximately .00543 plus of an inch) and the record groove has a maximum width of approximately .005 of an inch, thus leaving a spiral wall having a flat surface 13, having a minimum width of .00043 plus between consecutive convolutions of the groove 11.

The commercial record 10 constructed in accordance with this invention may be formed in any suitable manner but preferably by first cutting or otherwise forming in a soft record blank a "hill and dale"

groove of the same form and dimensions as that just described by means of any suitable tool but preferably by means of such a cutting tool as is shown in Figs. 2 and 3 and which consists of a jewel having a cylindrical portion 15 the free end of which is cupped out or countersunk as at 16 to provide a sharp circular cutting edge 17. In forming the "hill and dale" groove 11 the tool 15 is arranged in an inclined position as shown and is vibrated vertically by and in accordance with sound waves in a well known manner while the record blank is suitably rotated and is moved laterally with respect to the tool to cause the tool to cut a "hill and dale" spiral groove in the record blank. Commercial records are then made from the soft master record in any well known manner, as, for instance, by forming a suitable electrotype either directly or indirectly from the master record, backing up the electrotype and then utilizing the electrotype for pressing the commercial records.

In forming a master sound record it is customary to permit the tool to cut or form several smooth preliminary convolutions of the record groove before the tool is subjected to the action of sound waves, and these preliminary convolutions serve to receive the stylus or needle at a point prior to or in advance of the initial notes or sounds recorded upon the record and when the records are made of material which is slightly abrasive and steel needles are used, these preliminary convolutions wear the point of the needle slightly and shape it to the groove.

It has been found that commercial sound records constructed in accordance with this invention of any suitable record material but preferably of a material which is slightly abrasive, are well adapted to be used in cooperation with ordinary conically pointed needles such as are generally used in reproducing sounds from records of the "zig zag" type, and when so used are not subject to excessive wear and consequent rapid deterioration but will remain in good condition and give excellent results for a large number of sound reproductions. The slight amount of wear upon the steel needle produced by the walls of the preliminary convolutions of the record appears to be sufficient to shape the needle to the groove to such a degree that the needle thereafter slides over the "hill and dale" sound undulations of the groove without any excessive wear either on the needle or on the record.

In Figs. 4, 5 and 6 is shown very much enlarged one of the old forms of "hill and dale" records in which the record 20 is provided with a "hill and dale" spiral groove 21 having 96 turns or convolutions to the inch or a pitch of 1/96 of an inch and in which the successive convolutions overlap

and meet in sharp edges 22. In this old form the maximum width of the groove is considerably greater than the pitch of the groove and is considerably greater than
 5 twice the maximum depth of the groove. The groove in this old form is originally formed ordinarily by a cylindrical tool 25 similar to the one hereinbefore described and having a cupped end 26 forming a sharp
 10 circular edge 27, the diameter of which is considerably greater than the pitch of the record groove 21.

It has been found that, owing largely to the fact that in making the master record in
 15 accordance with this invention a comparatively small amount of resistance is encountered by the recording stylus or tool, commercial records constructed in accordance with this invention give very superior
 20 phonetic results, such for instance as improved definition and brilliancy of tone, an improved rendition of fine overtones and harmonics, a clear and characteristic reproduction of all of the various instruments and
 25 voices in *ensemble* productions of grand operas, and other improved results.

It has also been found that by having a flat wall of appreciable width or thickness between the successive convolutions of the
 30 record groove, these walls are not liable to become cracked or chipped either during the manufacture of the records or during subsequent use, whereas in the old form of record shown in Figs. 4, 5 and 6 a large per-
 35 centage of the records are spoiled during the process of manufacture by the cracking or chipping of the sharp edges 22 between the record grooves 21 while the records are being cooled suddenly while under compression,
 40 and a further large percentage of these old forms of records are spoiled while in use by the accidental chipping of these sharp edges 22.

Furthermore, in the new form of record
 45 shown in Figs. 1 to 3, the upper portions of the side walls of the record groove are either vertical or approximately vertical at points where the groove has a maximum depth and in any case have a steeper inclination than
 50 the side walls of the groove 21 in the old form and consequently the walls of the groove in the new form are of such a form as to serve as an effective guiding means for propelling the sound reproducing means
 55 across the record in reproducing sounds from the record, while in the old form the groove 21 is so shallow in proportion to its width and is of such a shape that the walls of the groove are not adapted to act effectively to guide and propel a sound repro-
 60 ducer, and require a mechanical feed for the sound reproducer to insure effective action.

Moreover, it is obvious that in the new
 65 form of record shown in Figs. 1, 2 and 3 a

relatively large amount of sound measured in time may be recorded on a record of given area, and there is therefore an appreciable economy of material which reduces the cost of the record both at the
 70 factory and in transportation and renders the record more convenient to handle and less liable to be injured. It is also obvious that this improved record has many other advantages over the old form of "hill and
 75 dale" record shown in Figs. 4 to 6.

Moreover, in this improved record owing to the shape in cross section of the walls of the record groove, practically the entire wall
 80 surface bounding or forming the groove acts as a wearing or bearing surface for vibrating the reproducing stylus and therefore this form of record has a wearing or bearing surface that relatively is much greater in
 85 area than (roughly speaking more than double) the wearing or bearing surface which acts to vibrate the reproducing stylus in a record of the "zig zag" type. For instance, in a "zig zag" record having a record
 90 groove of 184 turns to the inch, the groove owing to its laterally undulatory form could ordinarily have a width of not more than 2 or 3 thousandths of an inch and a depth of about the same amount and
 95 would evidently provide a much smaller undulatory bearing surface than is provided by the improved "hill and dale" record having a record groove of 184 turns to the inch and a maximum width of about .005 as
 100 shown in Figs. 1 to 3, particularly as the bottom wall of a laterally undulatory groove is smooth and of uniform depth and the vibration of the stylus and the feeding or propelling of the stylus across the record
 105 is effected mainly if not entirely by the action of only one of the side walls of the groove.

While for the purposes of this invention it is preferred to form this improved record of material which is slightly abrasive, or which
 110 contains an abrasive, it is to be understood that it is not necessary that an abrasive material be used as any other suitable material will give satisfactory results.

Moreover, although this improved record
 115 has been shown and described as provided with a record groove which in cross section at a point of maximum depth is approximately or substantially in the form of a semi-ellipse or slightly flattened semi-circle, it is to be understood that the invention
 120 is not limited to this particular form as at such a point the groove might be exactly semi-circular, or V-shaped or any other suitable shape. Although only one form has
 125 been shown and described in which this invention may be embodied, it is to be understood that the invention is not limited in its application to any specific construction but might be embodied in various forms with-
 130

out departing from the spirit of the invention or the scope of the appended claims.

Claims.

15 Having thus fully described this invention, I claim and desire to protect by Letters Patent of the United States:

1. A sound record having thereon a spiral groove comprising a plurality of convolutions of uneven depth forming "hill and dale" undulations corresponding to sound waves, and successive convolutions of said groove being separated at all points by a substantially flat topped wall, and said groove having a transverse sectional form which at a point of maximum width is substantially in the form of a slightly flattened semicircle.

2. A sound record having thereon a spiral groove comprising a plurality of convolutions of uneven depth forming "hill and dale" undulations corresponding to sound waves, and successive convolutions of said groove being separated at all points by a substantially flat topped wall, said groove having a maximum width less than the pitch of said spiral but equal to a major portion of said pitch, and having a maximum depth ordinarily approximating one-half of said

maximum width, and said groove having a transverse sectional form which at a point of maximum width is substantially in the form of a slightly flattened semicircle.

3. A sound record having thereon a spiral groove comprising a plurality of convolutions of uneven depth forming "hill and dale" undulations corresponding to sound waves, and successive convolutions of said groove being separated at all points by a substantially flat topped wall, said groove having a maximum width less than the pitch of said spiral but equal to a major portion of said pitch, and having a maximum depth ordinarily approximating one-half of said maximum width, and said spiral groove having a pitch of approximately one hundred eighty-four turns to the inch and said groove having a transverse sectional form which at a point of maximum width is substantially in the form of a slightly flattened semicircle.

Signed at New York, in the county of New York and State of New York, this 29th day of June, A. D. 1915.

JOHN FLETCHER.

Witnesses:

A. I. GARDNER,
K. POLIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

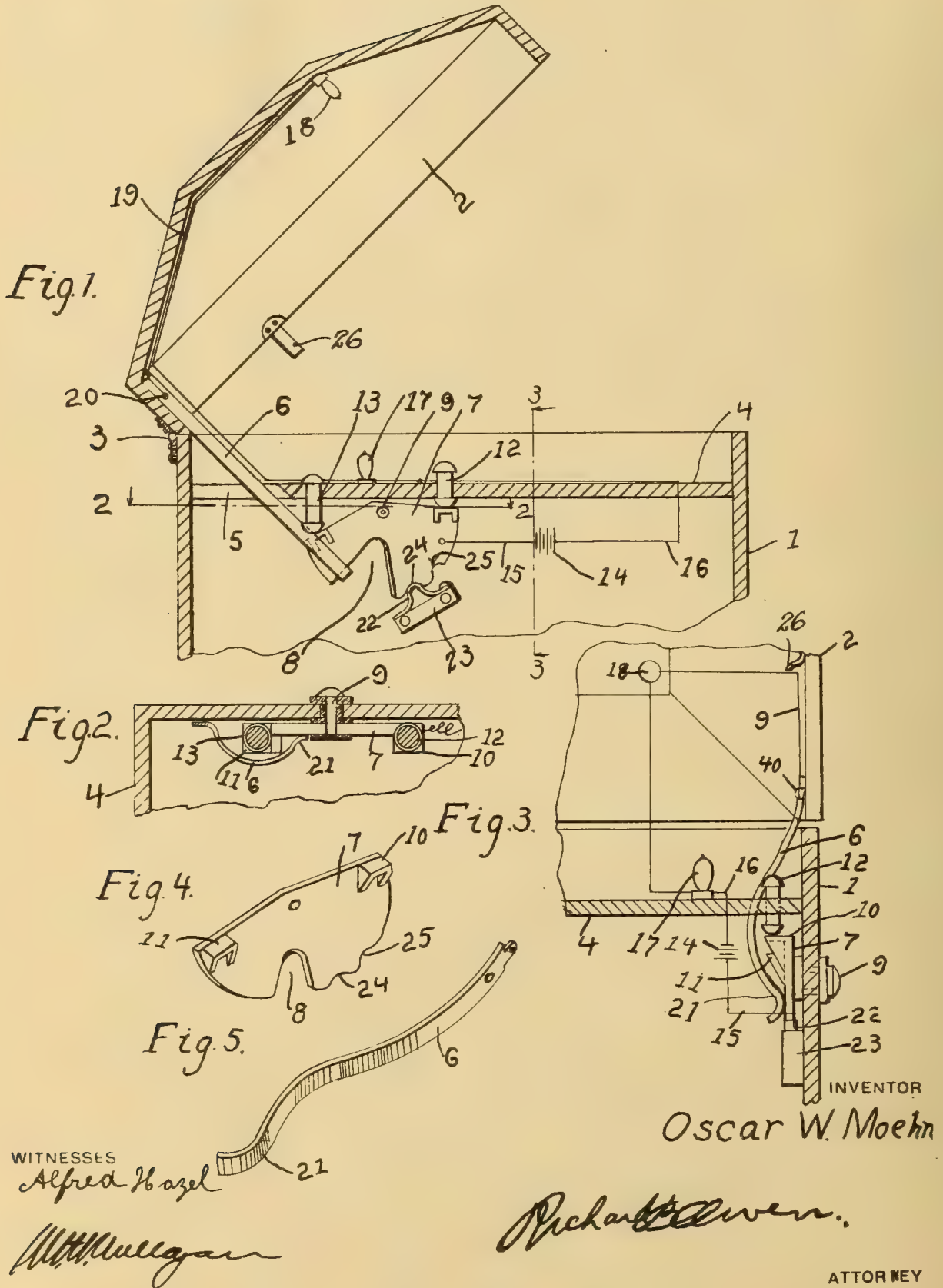
PHONOGRAPH LIGHT.

1,269,836 ----- C. W. Loehn,
Filed Oct. 10, 1917,
Patented June 18, 1918.

O. W. MOEHN.
 PHONOGRAPH LIGHT.
 APPLICATION FILED OCT. 10, 1917.

1,269,836.

Patented June 18, 1918.



UNITED STATES PATENT OFFICE.

OSCAR W. MOEHN, OF BURLINGTON, IOWA.

PHONOGRAPH-LIGHT.

1,269,836.

Specification of Letters Patent.

Patented June 18, 1918.

Application filed October 10, 1917. Serial No. 195,803.

To all whom it may concern:

Be it known that I, OSCAR W. MOEHN, a citizen of the United States, residing at Burlington, in the county of Des Moines and State of Iowa, have invented certain new and useful Improvements in Phonograph-Lights, of which the following is a specification.

This invention relates to phonograph attachments and more particularly to a device for permitting illumination of the phonograph when the cover of the same is raised whereby a record may be placed in position or the different moving parts adjusted which often is a difficult matter unless the proper light is afforded.

One of the principal objects of this invention is to provide an electric light bulb at a suitable point and so connected with an electric circuit that the lights will be illuminated when the cover of the phonograph is raised and extinguished when the cover is closed.

A further object of the invention is to provide an illuminating device of this character that will include a switch permitting the lights to be turned off and on when the cover is raised but which will always be disposed to cause the light to be extinguished when the cover is closed.

A further object of this invention is the provision of a phonograph light which consists of comparatively few parts and is simple in construction but durable and well adapted to withstand the rough usage to which devices of this character are ordinarily subjected.

For a full description of the invention and the advantages and merits thereof, reference is to be had to the following description and the accompanying drawings, wherein is illustrated the preferred form of my invention, in which:—

Figure 1 is a fragmentary section through a phonograph casing and cover showing my invention applied thereto.

Fig. 2 is a fragmentary section taken on the line 2—2 of Fig. 1.

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Fig. 4 is a detail perspective of the movable switch member.

Fig. 5 is a perspective view of a further detail of the invention.

Referring to the drawings wherein is illustrated the preferred form of my invention, in which like numerals of reference indicate

corresponding parts throughout the several views, the phonograph casing 1 is provided with the usual top cover 2 which is hingedly mounted as at 3 whereby the cover may be opened and closed as desired. The top wall 4 of the phonograph casing is provided with a slot 5 through which is extended a switch arm 6 having one end rigidly secured to the cover 2 on its inner surface and, therefore, this switch member swings with the cover when it is opened and closed and normally depends in a vertical position when the cover is closed. Pivotally mounted on the side wall of the casing beneath the top 4 is a switch plate 7 shown in detail in Fig. 4 of the drawing. This switch plate is substantially in the form of a segment of a circle and has an enlarged notch 8 for the reception of the end of the switch arm 6 when the plate is moved to a predetermined position. The plate 7 is pivotally mounted on a pin 9 suitably insulated from the wall of the phonograph and as shown in detail in Fig. 4 the plate has a projecting flange 10 and 11 at each end of the upper edge. A push button 12 is extended through an opening in the top wall 4 and this push button engages with the flange 10 while a push button 13 is also slidably mounted in an opening in the top wall 4 and engages the flange 11. A source of current indicated at 14 is connected by a conductor 15 to the plate 7 and from the opposite terminal of the battery a conductor 16 is extended which is connected to a light 17. From this light the conductor continues to a light 18 carried by the cover and a conductor 19 is led from the light 18 to a contact point 20 near the end of the switch arm 6. It will be obvious, therefore, that when the switch arm is in contact with the plate 7 a circuit will be completed and the lights will be illuminated. As soon as the switch arm moves off the plate 7 the circuit will be broken and the lights extinguished. The plate 7 is disposed in a position to permit the curved end 21 of the switch arm 6 to contact with the plate when the cover 2 is opened. After this circuit is made the lights will be illuminated and it will be noted by pressing upon the button 12 to move the plate 7 the end 21 of the switch arm 6 will be received in the space 8 in the plate 7 and the circuit will be again broken whereby the lights will be extinguished. Without changing the position of the cover, the lights may again be illuminated by pressing on the button 13

thus causing the plate 7 to move in the opposite direction for disposing the end 21 out of the space 8 and bringing it into contact with the plate 7 for closing the circuit. Attached
 5 to the cover 2 is a finger 26 the end of which is disposed to engage the button 13 when the cover is closed, thus when the cover is closed the finger 26 will engage the button 13, if the latter is raised and press the same
 10 downwardly to move the plate 7 into position for engagement with the switch arm 6 when the cover is again opened.

For holding the plate 7 in the desired position, I have provided a spring clip 22 having one end rigidly fixed to a block 23 while
 15 the opposite end is slidably mounted on the block. The intermediate portion of the spring clip is disposed to register with any one of the two notches 24 and 25 according
 20 to the position of the plate.

From the foregoing it will be observed that a very simple and durable phonograph light has been provided, the details of which embody the preferred form. I desire it to
 25 be understood, however, that slight changes in the minor details of construction may be made without departing from the spirit of the invention or the scope of the claims hereunto appended.

30 Claims:

1. A phonograph lighting device comprising, the combination with a phonograph having a movable cover, a switch arm carried by the cover and movable therewith, a
 35 switch plate pivotally mounted and adapted to be engaged by the said switch arm, a source of current, conductors connecting the said source of current, switch arm and switch plate, the said switch plate being disposed to contact with the said arm when the
 40 cover is raised, and means to permit the plate to be moved out of engagement with the said arm when the said cover is raised.

2. A phonograph having a cover hingedly
 45 mounted thereon, a switch plate pivotally mounted, means for swinging the said switch plate, a switch arm carried by the said cover and adapted to contact with and disengage the said plate when the cover is
 50 raised and closed respectively, and means for operating the said plate to disengage or engage the said switch arm when the cover is opened.

3. The combination with a phonograph
 55 casing and a cover hingedly mounted there-

on, a switch plate hingedly mounted on the casing, a switch arm carried by the cover and movable therewith to engage the said switch plate, a pair of buttons engageable
 60 with the said switch plate for engaging it and disengaging it with the said switch arm when the cover is opened, and means for maintaining the said switch plate in set position after being operated by one of the
 65 said buttons.

4. The combination with a phonograph casing and a cover hingedly mounted thereon, a switch plate hingedly mounted on the casing, a switch arm carried by the cover and movable therewith to engage the said
 70 switch plate, a pair of buttons engageable with the said switch plate for engaging it and disengaging it with the said switch arm when the cover is opened, and means for maintaining the said switch plate in
 75 fixed position after being operated by one of the said buttons, the said means including a spring clip having a portion engageable with the periphery of the said plate, the latter having notches for the reception
 80 of the said clip.

5. The combination with a phonograph casing and a cover hingedly mounted thereto, the casing including a top wall having an elongated slot, a switch arm carried by
 85 the said cover and projecting through the said slot to be moved beneath the said wall when the cover is opened and closed, a switch plate disposed to be engaged by the said switch arm when the said cover is
 90 opened, push buttons slidably mounted in the said wall and engageable with the said plate to move the latter into and out of engagement with the said switch arm when the latter is in operative position, the periphery of the said plate being provided
 95 with notches, a spring clip fixedly mounted on the casing and having a portion adapted to register with either of the said notches, a source of current connected to the said
 100 switch plate and having conductors leading to the said switch arm, and lamps interposed in the conductors and mounted on the said wall and the said cover.

In testimony whereof I affix my signature in presence of two witnesses.

OSCAR W. MOEHN.

Witnesses:

FRANK G. NEBIKER,
 FRED W. BOESCH.

SOUND BOX.

1,269,965 ---- C. H. Shaw,
Filed May 6, 1915,
Patented June 18, 1918.

Patented June 18, 1918.

1,269,965.

Fig. 1.

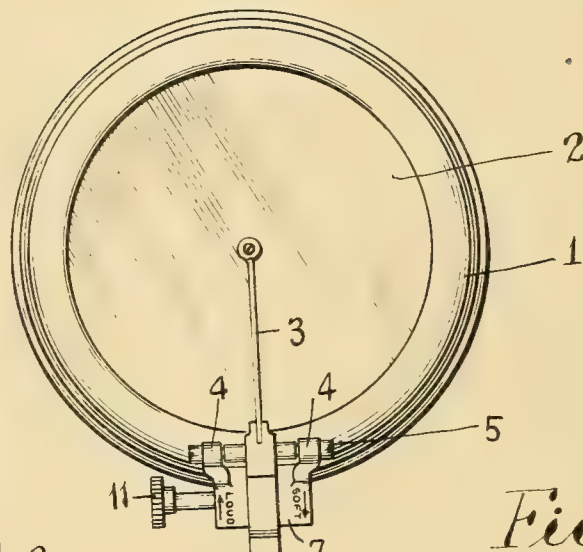


Fig. 2.

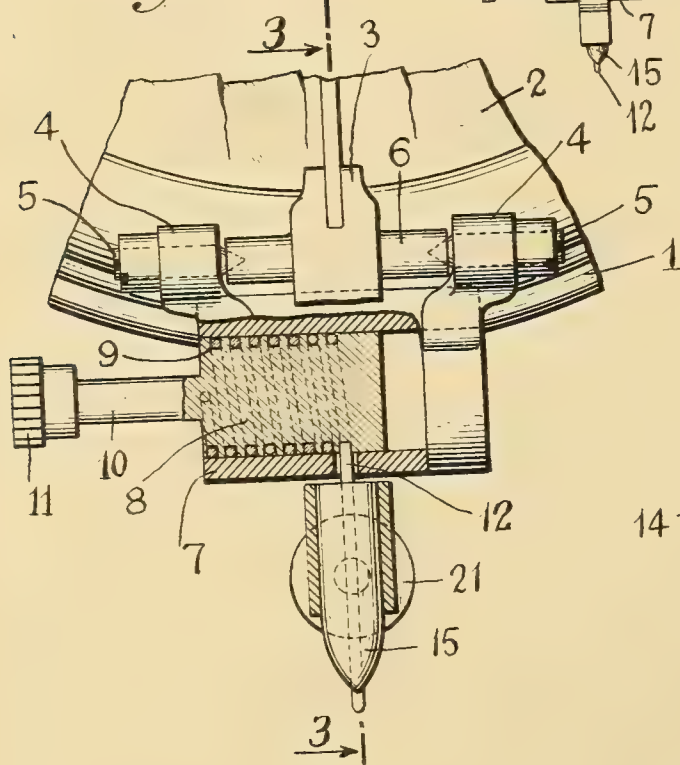


Fig. 3.

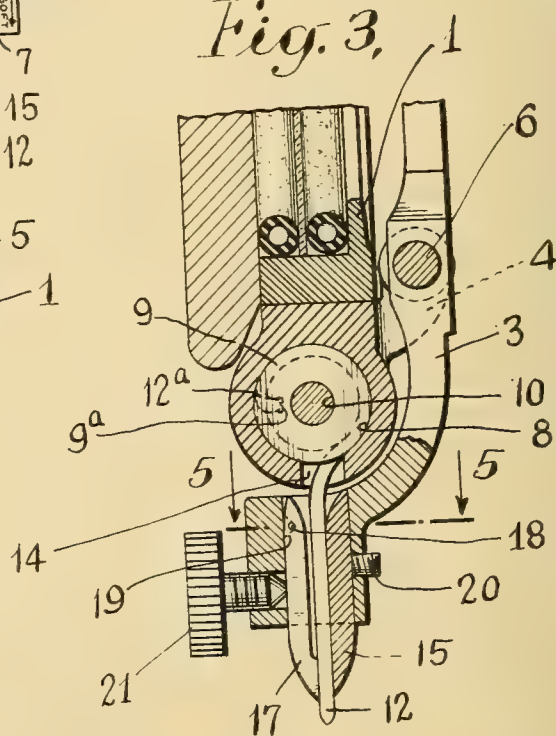


Fig. 4.

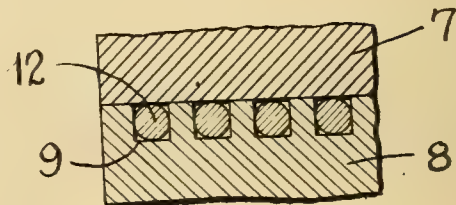
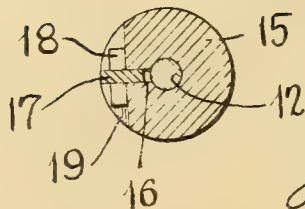


Fig. 5.



INVENTOR
Charles H. Shaw
BY
Edw. Scherr
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UNITED STATES PATENT OFFICE.

CHARLES H. SHAW, OF BABYLON, NEW YORK, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

SOUND-BOX.

1,269,965.

Specification of Letters Patent. Patented June 18, 1918.

Application filed May 6, 1915. Serial No. 26,331.

To all whom it may concern:

Be it known that I, CHARLES H. SHAW, a citizen of the United States, residing at Babylon, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Sound-Boxes, of which the following is a specification.

My present invention relates to improvements in sound-boxes, especially to means for employing a wire stylus in connection therewith and for quickly adjusting it at will to play the phonograph record with any desired degree of loudness or softness. The object and advantages of my invention will be apparent to those skilled in the art from an understanding of the following description in connection with the drawings. In these, Figure 1 is a face view of a sound-box embodying my invention; Fig. 2 is an enlarged detail view of the lower portion of Fig. 1, shown partly in vertical section and partly in elevation; Fig. 3 is a sectional view on the line 3—3 in Fig. 2 looking in the direction of the arrows; Fig. 4 is an enlarged fragment of Fig. 2; and Fig. 5 is a horizontal section on the line 5—5 in Fig. 3 looking in the direction of the arrows.

I will now describe the specific devices of the drawings, illustrating one embodiment of my invention. The general features of the sound-box may have any desired or preferred form, those shown comprising a casing 1, diaphragm 2, stylus bar 3, and a pivotal suspension therefor comprising the lugs 4—4 supported stationarily on the sound-box casing 1, and pivot screws 5—5 supported respectively in said lugs, with their points coöperating with appropriate centers in the cross-piece 6 of the stylus-bar.

The free end of the stylus bar 3 is bent so as to bring its stylus-holding extremity at the peripheral edge of the box. Between it and said edge is a space wherein is located an open-ended, cylindrically hollow casing 7 forming part of or mounted stationarily on the sound-box casing. 8 is a spool rotatable snugly within the cylindrical hollow of the casing 7; and is also movable endwise therein. 9 is a spiral groove or screw-thread on this spool. 10 is the stem of the spool having a knurled head or finger-piece 11.

12 is a piece of wire, preferably piano wire about 7 thousandths of an inch in diameter which is housed ready for use in a spiral coil surrounding the spool 8 located in the spiral groove 9. One end 12^a of this wire is bent so as to project into a radial hole 9^a in the spool at the last or rearmost spiral. This conveniently anchors said end of the wire to the spool, so that rotation of the spool will cause the wire to wrap around it and vice versa to unwind from it. The opposite free end of the wire projects through a hole 14 in the bottom wall of the spool-casing 7, thence through wire clamping means supported on the free end of the stylus-bar. This means comprises a tubular part or nipple 15 having its wall longitudinally slotted at 16, in which slot there is a movable jaw 17 having a cross-pin 18 at its upper end located in a pair of notches 19—19 formed in the outside of the nipple 15 adjacent the slot therein. In assembling the parts, the nipple and jaw are inserted up into the cylindrical hole formed to receive them in the free end of the stylus bar 3 as shown in Fig. 3, and a set screw 20 fixes the nipple rigidly therein. 21 is a thumb-screw positioned to bear against the locking jaw 17 and adapted when tightened to cause the stylus wire to be clamped between the free end of said jaw 17 and the nipple part 15, and vice versa to permit said wire stylus to be released preparatory to effecting a readjustment of said stylus.

On the spool casing 7 will be marked two arrows as shown in Fig. 1 with the words "Soft" and "Loud" respectively, or their equivalents such as "Out" and "In" respectively. This indicates to the user that to play more softly the finger piece 11 should be turned in the direction of the "soft" arrow; and to play more loudly should be turned in the direction of the "loud" arrow. In the first case, the spool will be rotated in the direction which unwinds the wire therefrom and which causes it to be delivered to an extent proportionate to the rotation through the hole 14 and thence through the nipple 15 so that its record engaging point is made to project to a greater distance than formerly which means that it will have less rigidity and will play more softly. In the second case, the rotation being in the direction of

wrapping the wire to a still greater extent about the spool, its record-engaging point will be retracted and will have relatively greater rigidity and will play louder. Thus the wire-stylus can be adjusted to play any and all degrees of tone desired from the loudest to the softest and all gradations between, by a simple turn of the finger-piece 11. Of course after the wire has been adjusted to project to the desired extent, the clamping screw 21 will be tightened so as to grip the wire as a preliminary to playing the record.

The spiral groove 9 in which the wire lies keeps its natural springiness within bounds and also controls or supports its flimsiness so that it can be successfully adjusted as described.

The side-walls of the spiral groove 9 are substantially normal to the surface of the spool, that is to say are not inclined thereto to any great extent, because if they are, the wire will tend to wedge and jam between said inclined side-walls and the inside of the spool-casing when the spool in its rotation moves endwise therein, thereby either seriously interfering with or nullifying the operation of the device.

In the actual device, it is easily possible to house and handle a length of wire sufficient to play a great many thousand records. Further this wire may be replaced, when used up, without removing the spool. To do this, the user positions the spool both lengthwise and rotatably within its casing so that the socket 9^a is alined with the bore of the nipple 15. The end of the wire will then be inserted through said nipple into said socket. The finger piece 11 will then be rotated in the direction of the "loud" or "in" arrow, which will result in bending the wire just beyond its extremity 12^a (Fig. 3) in the socket 9^a, so that the rest of the wire will be laid down in the spiral groove and wrapped about the spool by the rotation of the finger piece 11 which will be continued until all but the free end of the wire is drawn into the nipple.

Of course some changes and modifications might be made in the above that are nevertheless within the spirit of this inventive disclosure and these I mean to cover by the annexed claims under the doctrine of equivalents. Further certain of the means might be used without the remainder or in connection with equivalent means.

What I claim is:

1. The combination, with a sound-box, of a stylus-wire, a rotatable part on which the wire is wound, a rotatable part having a spiral groove wherein the wire is located.

2. The combination, with a sound-box, of a stylus-wire, a rotatable part on which the wire is wound and by which it is adjustable, the stylus bar, and means for operatively

securing the free end of the wire to said bar, the rotatable part having a spiral groove wherein the wire is located.

3. The combination, with a sound-box, of a stylus bar, stylus clamping means on said bar, a stylus wire passing through said clamping means, and a rotatable part on which said wire is wound and by which the extent of its projection from said clamping means is adjustable, the rotatable part having a spiral groove wherein the wire is located.

4. The combination with a sound-box, of a stylus-wire, and a rotatable part on which the wire is wound and by which it is adjustable, the rotatable part having a spiral groove wherein the wire is located, said groove having a socket leading therefrom adapted to anchor the wire at one end.

5. The combination with a sound-box, the stylus-bar, a stylus wire, means for operatively securing the free end of the wire to said bar, and a spirally grooved rotatable part wherein the wire is located.

6. The combination with a sound-box, the stylus-bar, a stylus wire, means for operatively securing the free end of the wire to said bar, and a spirally grooved rotatable part to which the other end of the wire is attachable with the wire located in said groove.

7. The combination with a sound-box and its stylus bar, of a stylus-wire, a stylus bar having a clamp-controlled eye for operatively receiving one end of said wire, and a spirally grooved rotatable part to which the other end of the wire is attachable with the wire located in said groove and by which it is deliverable opposite the eye of the stylus bar.

8. The combination with a sound-box, of a stylus-wire, a stationary cylindrically hollow casing having a hole through it to deliver one end of said wire into an operative playing position, and a spool within said casing about which the wire is wound, said spool being arranged for both rotary and endwise movement to feed said wire through the hole in said hollow casing.

9. The combination with a sound-box and its stylus-bar, of a stylus-wire, the stylus bar having a clamp-controlled eye for operatively receiving one end of said wire, a stationary cylindrically hollow casing having a hole through it to deliver said end of the wire opposite said eye, and a spirally grooved rotatable and endwise movable spool within said casing to which the other end of the wire is attachable with the wire located in said groove and leading through said hole.

10. The combination with a sound-box, of a stylus-wire, a rotatable part on which the wire is wound and by which it is adjustable, the rotatable part having a spiral groove

wherein the wire is located, and a coöperating stationary part adjacent to said rotatable part, the side-walls of the spiral groove in the rotatable part being substantially normal thereto.

11. The combination with a sound-box, of a stylus-wire, of a stationary cylindrically hollow casing having a hole through it to deliver one end of the wire into an operative playing position, and a spirally grooved rotatable and endwise movable spool within said casing to which the other end of the wire is attachable with the wire located in said groove and leading through said hole in the spool-casing, the side-walls of said spiral groove in the rotatable spool being substantially normal to the cylindrical surface thereof.

12. The combination, with a sound-box; of a hollow, cylindrical casing arranged substantially tangentially of and connected to said sound-box; and a spool mounted within said casing and adapted to have a stylus-wire wound spirally around it; said casing being provided between its ends with an opening to deliver the free end of the wire into operative playing position, and

said spool being arranged for both rotary and endwise movement in said casing to respectively feed the wire through said opening and bring its successive convolutions into alinement with the same.

13. The combination, with a sound-box; of a hollow, cylindrical casing connected thereto; a stylus-bar having a rocking mounting intermediate its ends on said casing; a spool mounted within said casing and adapted to have a stylus-wire wound spirally around it, said casing having a delivery opening for the wire intermediate its ends; and wire-holding means carried by the free end of the stylus-bar and having an axial opening which registers with the first-named opening; said spool being arranged for both rotary and endwise movement in said casing to respectively feed the wire through said openings into operative playing position and bring its successive convolutions into alinement with the same.

In testimony whereof, I have signed my name to this specification this 4th day of May, 1915.

CHARLES H. SHAW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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FILING CABINET.

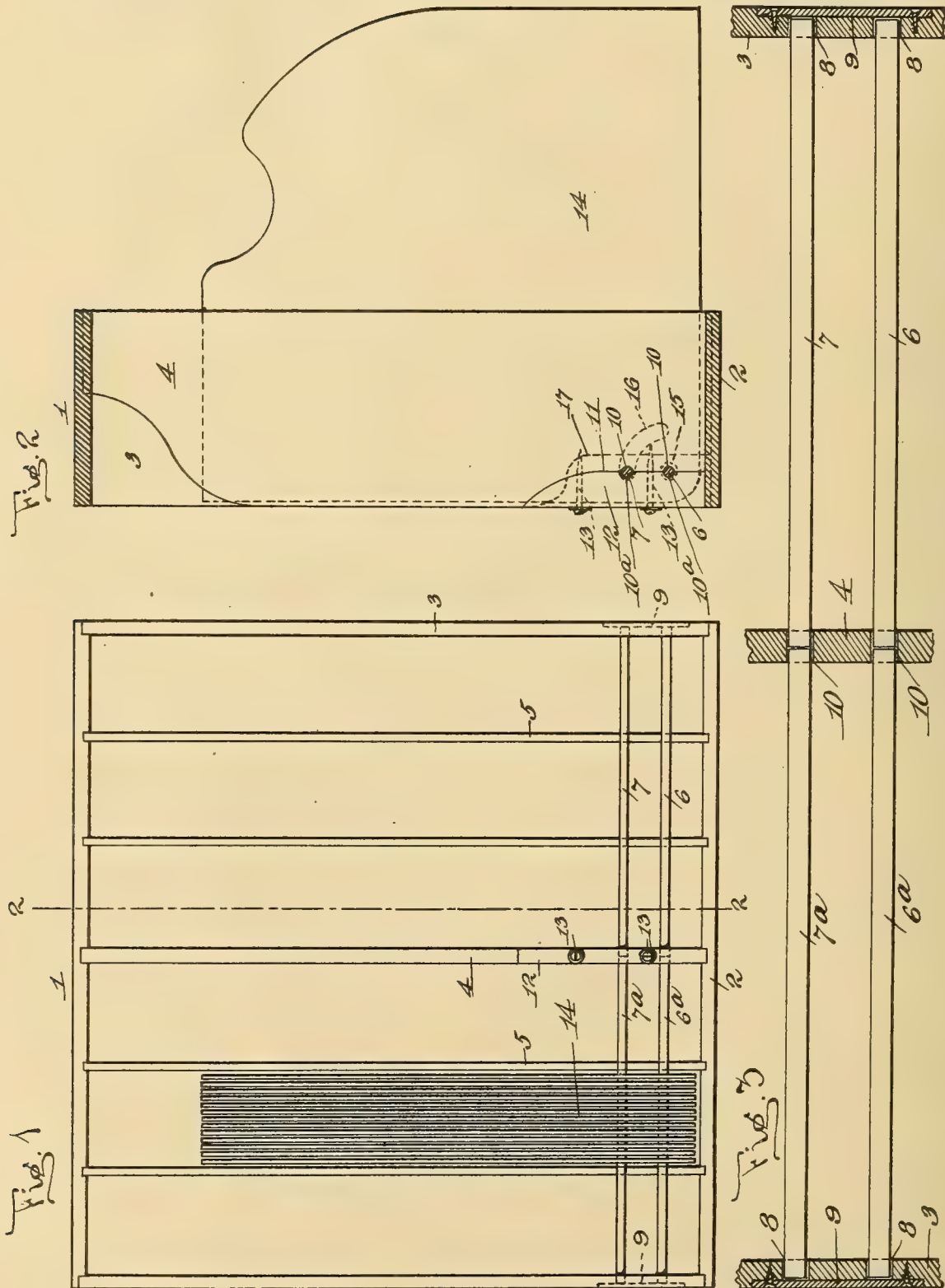
1,270,260 ---- T. D. Brown,
Filed Feb. 1, 1917,
Patented June 25, 1918.

T. D. BROWN.
FILING CABINET.

APPLICATION FILED FEB. 1, 1917.

1,270,260.

Patented June 25, 1918.



Inventor
Thomas D. Brown
by Schuchter & Latsch
his Attys.

UNITED STATES PATENT OFFICE.

THOMAS D. BROWN, OF NEW YORK, N. Y., ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

FILING-CABINET.

1,270,260.

Specification of Letters Patent.

Patented June 25, 1918.

Application filed February 1, 1917. Serial No. 145,946.

To all whom it may concern:

Be it known that I, THOMAS D. BROWN, a subject of the King of Great Britain and Ireland, and a resident of the borough and county of Richmond, city and State of New York, have invented a certain new and useful Improvement in Filing-Cabinets, of which the following is a specification.

My invention relates to filing cabinets for talking machine disk records, and more particularly to the type wherein each record is inclosed in a separate receptacle, all of which are loosely mounted on a rod so that any record may be withdrawn without disturbing the others, and wherein a second rod extends through all of the receptacles and acts as a stop to limit the pivoting of the receptacles.

The object of my invention is to provide means whereby a receptacle may be readily removed from the cabinet and a new one substituted without the necessity of dismantling the cabinet.

This and further objects will more fully appear in the following specification and accompanying drawings considered together or separately.

I have illustrated one embodiment of my invention in the accompanying drawings, in which like parts are designated by similar reference characters in all the figures, and in which,—

Figure 1 is a front elevation of a rack for carrying a number of individual record disk receptacles;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 is a detail sectional view on an enlarged scale.

In carrying out my invention, I provide a rack composed of a top member 1, a bottom member 2, and side members 3, 3. I employ a central partition 4, and between the partition 4 and the side members 3, 3, I may provide partitions 5 by means of which the records may be divided into classes.

Carried in the side members 3, 3, is a pivot rod composed of two sections 6 and 6^a. A stop rod composed of two sections 7 and 7^a is likewise carried by the side members 3, 3, and is preferably positioned vertically above the sections 6 and 6^a. The rod sections are carried in sockets 8, 8 in the side members and bear against plates 9,

9 screwed or otherwise secured to the side members.

The partition 4 has a cut-away portion 11, the vertical edge of which is in alignment with the axis of the rod sections. The inner end of each rod section is seated in a semi-cylindrical recess 10 in the cut-away portion 11 of the partition 4, and a corresponding socket 10^a in a filler piece 12 engages the ends of the rods and retains them in position. The filler piece is secured in the cut-away portion by means of screws 13 or otherwise.

The record receptacles have each a perforation 15 near one corner thereof, by means of which the receptacles are threaded on the rods 6 and 6^a. Each receptacle is provided with a segmental slot 16 which is engaged over a rod section 7 or 7^a. The slots are radial to the rods 6 and 6^a so that the receptacles may be pivoted on the rods 6, 6^a, and are of such a length that the receptacles are limited in their movements by the engagement of the rods 7, 7^a with the ends of the slots.

The partitions 5 are cut away as shown in dotted lines at 17, Fig. 2, so that the rods will be accessible from the front.

When it is desired to insert a new receptacle or remove an old one which has become broken, the filler piece 12 is removed. This will uncover the inner ends of the rods which may then be pulled out of the sockets 8 in the side members, and all of the receptacles may be removed from the rack, and damaged ones may be removed and new ones substituted.

The receptacles may be replaced in the rack by reversing the operation above described.

The racks may be made up of different sizes, of different material, or with different arrangements of partitions, and are inserted in the compartments of the talking machine cabinet or in a book-case or the like.

I desire it understood that my invention is not confined to the particular form of apparatus herein shown, and described, and, therefore, I claim broadly the right to employ all equal instrumentalities coming within the scope of the claims and by means of which objects of my invention are obtained and the new results accomplished, as herein set forth. As it is obvious that the particular embodiment herein illustrated is

only one of many that may be employed, as for instance, the device can be constructed by eliminating the partition 4 with its cut-away portion 11, and in place of having rods 5 7, 7^a, and 6, 6^a, each made up of two sections, the device can be constructed so as to eliminate the partition 4 with its cut-away portion 11, and have in its place the dividing partition 5 with rods constructed of one 10 piece instead of two, and having the side members 3 either having a cut-away portion similar to 11, or having a short strip covering the front edge of the sides 3, the same being screwed in place which can be readily 15 removed when it is desired to insert a new receptacle or replace a broken one. Such removing of the cut-away portions, which will be similar to the cut-away portion 11, or such small strips, will uncover the ends 20 of the rods which may then be pulled out of their respective sockets in the side members, and all the receptacles may be removed from the rack, and the damaged ones may be removed and new ones substituted. It is 25 to be understood that while I have given one instance of a modified form of my invention, that I am not to be limited to this modification.

In accordance with the provisions of the 30 patent statute, I have described the principle of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is 35 merely illustrative and that the invention can be carried out in other ways.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

40 1. An article of the class described, comprising a frame, a receptacle in the frame, a pivot for the receptacle, said pivot member being removable without removing the re- 45 ceptacle from the frame, a second member passing through the receptacle, and means

whereby the second member may be removed without removing the receptacle from the frame.

2. An article of the class described, comprising a frame, a receptacle in the frame, 50 a pivot for the receptacle, said pivot member being removable without removing the receptacle from the frame, a second member passing through the receptacle, there being a segmental slot in the receptacle engaged 55 by said member, and means whereby the second member may be removed without removing the receptacle from the frame.

3. An article of the class described, comprising a frame having a central partition 60 and side members, a rod carried in a socket in each side member, each rod engaging a socket in the partition, said rods being in alinement, means for securing the ends in the partition, a plurality of receptacles piv- 65 oted to each rod, a second rod carried in a socket in each side member, and each engaging a socket in the partition, and means for securing the ends of the second rod in the partition, said latter rods engaging slots in 70 the receptacles.

4. An article of the class described, comprising a frame, having side members, and a central partition, a plurality of sockets in each side member, a rod carried in each 75 socket, the rods in each pair alined with their ends resting in an open socket in the partition, a keeper secured to the partition for retaining the rods in position, and a plurality of receptacles pivotally mounted on 80 one pair of alined rods, the second pair of alined rods engaging segmental slots in the receptacles to limit the pivotal movement of the receptacles.

This specification signed and witnessed 85 this 27th day of January, 1917.

THOMAS D. BROWN.

Witnesses:

FRANK J. COUPE,
C. J. HERMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

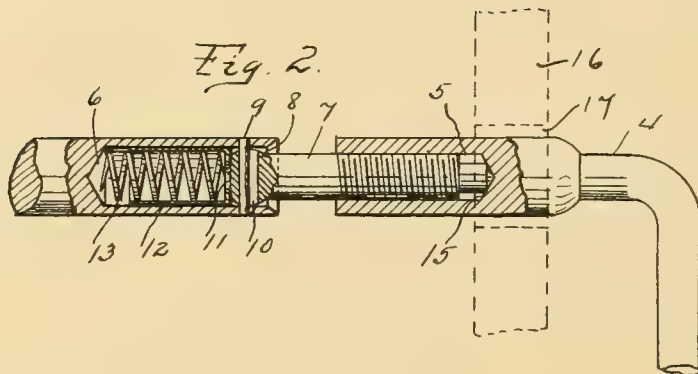
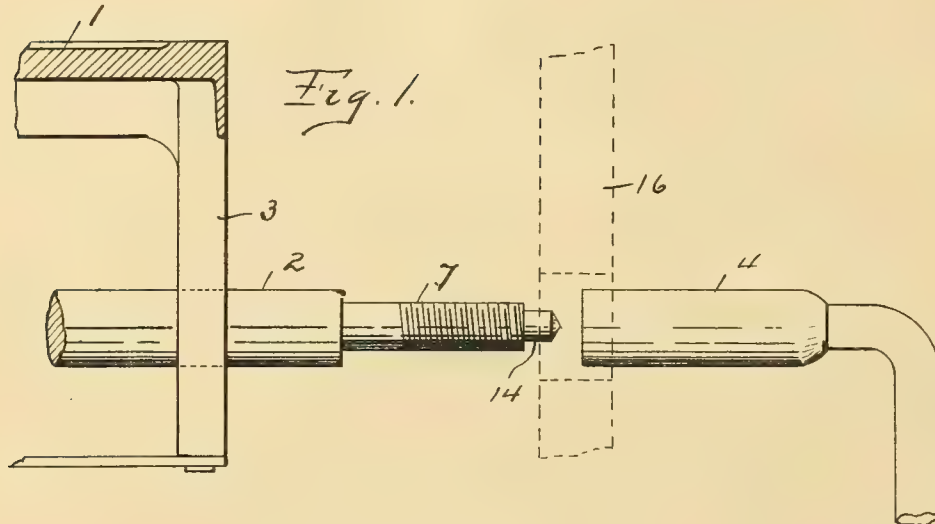
SPRING MOTOR WINDING SPINDLE.

1,270,265 ----- P. Catucci,
Filed Apr. 26, 1917,
Patented June 25, 1918.

P. CATUCCI.
 SPRING MOTOR WINDING SPINDLE.
 APPLICATION FILED APR. 26, 1917.

1,270,265.

Patented June 25, 1918.



Pliny Catucci INVENTOR.

BY

Louis M. Sandere ATTORNEYS.

UNITED STATES PATENT OFFICE.

PLINY CATUCCI, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
OTTO HEINEMAN PHONOGRAPH SUPPLY CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SPRING-MOTOR WINDING-SPINDLE.

1,270,265.

Specification of Letters Patent.

Patented June 25, 1918.

Application filed April 26, 1917. Serial No. 164,594.

To all whom it may concern:

Be it known that I, PLINY CATUCCI, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Spring-Motor Winding-Spindles, of which the following is a specification.

My invention relates to improvements in talking machine motors and has to do particularly with the winding spindle. In modern practice it is common to suspend the spring motor from the lower side of a board, either square or oblong, which serves the dual purpose of a motor support and an inside cover for the cabinet or case. The winding shaft or spindle projects laterally or horizontally from the motor frame in the direction of an aperture in the side of a cabinet, through which the winding crank is to be inserted and coupled to the winding spindle. Notwithstanding the accuracy of the measurements, and directions given for installing the motor in the cabinet, and although the motor is of a standard pattern it very frequently happens that the motor is not accurately mounted upon the board, or the aperture is not accurately bored through the side of the cabinet, with the result that the winding spindle does not register accurately with the aperture. Under these conditions it is often difficult and sometimes impossible to attach the winding crank to the spindle; and when attached it often binds in the aperture, and in many cases the winding spindle has been so bent and distorted and even broken by an inexperienced operator as to render the entire machine useless. Another serious objection is found in the imperfect alinement of the winding crank with the spindle; this causes a binding in the side aperture, and in many types of machines, a shifting of the motor board either up and down or laterally, unless it is firmly secured in place and then, where there is a screw connection between the crank and spindle a broken spindle naturally follows. This imperfect alinement of crank and spindle may be due to bending under excessive strain in winding, or an accidental blow, or any one of many causes.

I have found that by providing a jointed or flexible connecting end for the spindle I am able to entirely overcome the objection-

able strains due to imperfect alinement, and the shifting of the motor board, while winding, is completely avoided.

In the accompanying drawings which illustrate the preferred form of my improvement—

Figure 1 shows a fractional view of so much of a well known standard spring motor as is necessary to fully understand my invention. The winding crank is shown detached, and the relative position of the side of the cabinet is shown in dotted lines.

Fig. 2, is a longitudinal section of the winding spindle with the crank in place.

Similar reference numerals are applied to like parts throughout the specification and drawings.

The motor frame 1, may be of any usual or preferred type, that shown being one of a well known standard make now on the market. A winding spindle 2, is journaled in a bearing stanchion 3, and extends horizontally away from the frame 1, to a distance convenient for the attachment of a winding crank 4. The crank connection shown is the well known screw connection; that is to say, the spindle is provided with a reduced, screw-threaded extension to receive a screw-threaded socket 5, of a crank 4. As above indicated, it has been the usual practice to make this screw threaded extension integral with the spindle. In the present case I provide spindle 2, with a large socket 6, in its outer end. The extension 7, is provided with a spherical head 8, of a diameter to nicely fit into the socket 6, where it is pivotally secured in place by a pin 9, which passes through a slightly elongated diametrical slot 10, in the head 8, and through the walls of the socket 6. In order to preserve the normal alinement of the axes of the spindle 2, and extension 7, I employ the following means:

The inner part of the head 8, is flattened as at 11. A spring cup 12, and spring 13, are inserted into the socket 6, with the bottom of the cup bearing upon the flattened part 11. The spring 13, bottoms on the inner end of the socket 6, and being under considerable compression, always tends to hold the screw-threaded extension 7, in alinement with the spindle, with the pin 9, at the end of the slot 10. When moved out of alinement in any direction, the spring

13, acting through the cup 12, upon the flattened part 11, of the head 8, has a constant tendency to restore such alinement.

The structure is in effect a sectional winding spindle with a universal joint connecting the sections thereof, and is provided with means for restoring and normally maintaining axial alinement of such sections.

10 The outer end of the screw extension 7, is provided with a short blunt stud 14, intended to engage the bottom of the socket 15, of the crank 4, to prevent screwing the same too tight.

15 From the foregoing description it will be readily seen that the extension 7, is maintained in perfect alinement with the spindle 6, and when the crank 4, is in position as shown in Fig. 2, the strains of the crank

20 will be exerted rather upon the wall 16, of the cabinet or more particularly upon the walls of the aperture 17. Moreover any slight discrepancy in the alinement of the spindle 6, with the aperture 17, will not result in any undue strains upon the spindle

25 6, due to the forcing of the crank socket through the aperture 17, and the screwing of the same home upon the extension 7; for such extension 7, will adjust itself to the position of the aperture 17, and even though

30 such aperture is out of alinement, the universal joint connection between the spindle 6, and the extension 7, will assist in avoiding any of these undue strains.

35 The tendency of talking machine motor manufacturers at the present time is to direct their attention to the minor defects and improve the details of the already standardized motor. Production of talking machines

40 during the last few years has been a somewhat complicated business matter. The manufacture of the motor and metal parts has been confined to one factory while the manufacture of the cabinet is delegated to

45 an entirely different factory. And still a third party procures his motors in one place and his cabinets in another place; his business being solely that of an assembler of manufactured parts. It thus becomes necessary

50 to provide motors of a character to meet the requirements of the different cabinet manufacturers and assembly companies, and the present invention is but one of a series of steps in that direction.

55 I claim:

1. A winding spindle for spring motors comprising a main shaft section and an extension section, there being a universal joint connection between the sections thereof, a screw thread on said extension section, and a removable section carrying a crank, a screw threaded bore in said section cooperating with the screw threaded portion of the extension section to actuate the mechanism.

2. A winding spindle for spring motors comprising a main shaft section and an extension section, there being a universal joint connection between the sections thereof, in combination with means for holding said sections in normal axial alinement, a screw thread on said extension section and a removable section carrying a crank, a screw threaded bore in said section cooperating with the screw threaded portion of the extension section to actuate the mechanism.

3. A winding spindle for spring motors comprising a main section and a removable operating extension section, with a universal joint connection between said sections, a screw thread on said extension section, and a removable section carrying a crank, a screw threaded bore in said section cooperating with the screw threaded portion of the extension section to actuate the mechanism.

4. A winding spindle for spring motors comprising a main section having an axial socket in one end thereof, and an extension section having a spherical head thereon, said head being pivoted within said socket, there being a slot in the head, a spring within said socket bearing upon said head for resiliently holding said sections in normal axial alinement, a screw thread on said extension section and a removable section carrying a crank, a screw threaded bore in said section cooperating with the screw threaded portion of the extension section to actuate the mechanism.

5. In a winding spindle for spring motors, the combination of a main spindle section having a cylindrical socket in the free end thereof, with an extension section pivotally connected with said main section within said socket, resilient means within said socket for holding said extension section in the outer end of said socket, a screw thread on said extension section and a removable section carrying a crank, a screw threaded bore in said section cooperating with the screw threaded portion of the extension section to actuate the mechanism.

6. A winding spindle for spring motors, having a main spindle section, there being a socket within one end of the section, an extension section, a ball on the end of said section, said ball resting within the socket, there being a slot in the ball, a pin passing through the slot to retain the ball in the socket, one side of the ball being flattened, a cup within the socket and resting against the flattened surface, a spring engaging the cup with the ball, and a removable section carrying a crank.

7. A winding spindle for spring motors, having a main spindle section, there being a socket within one end of the section, an extension section, a ball on the end of said

section, said ball resting within the socket, there being a slot in the ball, a pin passing through the slot to retain the ball in the socket, a spring with the socket engaging the ball for resiliently holding the extension section in the extremity of the socket and in normal axial alinement with the main spindle section, and a removable section carrying a crank.

8. A winding spindle for spring motors comprising a main shaft section and an extension section, there being a universal joint connection between the sections thereof, a screw thread on said extension section, a short blunt stud on the screw threaded extension adapted to engage the bottom of the bore of the crank, and a removable section carrying a crank, a screw threaded bore in said section coöperating with the screw threaded portion of the extension section to actuate the mechanism.

9. A winding spindle for spring motors comprising a main shaft section and an extension section, there being a universal joint connection between the sections thereof, in combination with means for holding said sections in normal axial alinement, a screw thread on said extension section, a short blunt stud on the screw threaded extension adapted to engage the bottom of the bore of the crank and a removable section carrying a crank, a screw threaded bore in said section coöperating with the screw threaded portion of the extension section to actuate the mechanism.

10. A winding spindle for spring motors comprising a main section and a removable

operating extension section, with a universal joint connection between said sections, a screw thread on said extension section, a short blunt stud on the screw threaded extension adapted to engage the bottom of the bore of the crank, and a removable section carrying a crank, a screw threaded bore in said section coöperating with the screw threaded portion of the extension section to actuate the mechanism.

11. In a winding spindle for spring motors, the combination of a main spindle section having a cylindrical socket in the free end thereof, with an extension section pivotally connected with said main section within said socket, resilient means within said socket for holding said extension section in the outer end of said socket, a screw thread on said extension section, a short blunt stud on the screw threaded extension adapted to engage the bottom of the bore of the crank, and a removable section carrying a crank, a screw threaded bore in said section coöperating with the screw threaded portion of the extension section to actuate the mechanism.

12. A winding spindle for spring motors comprising a main shaft section and an extension section, there being a universal joint between the sections thereof, a removable section carrying a crank, means on the extension section for engaging the crank and means on the crank section coöperating with the means on the extension section to actuate the mechanism.

PLINY CATUCCI.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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SOUND MODIFIER FOR TALKING MACHINES.

1,270,278 ----- P. Farb
Filed Feb. 1, 1917,
Patented June 25, 1918.

P. FARB.
SOUND MODIFIER FOR TALKING MACHINES.
APPLICATION FILED FEB. 1, 1917.

1,270,278.

Patented June 25, 1918.

Fig. 1

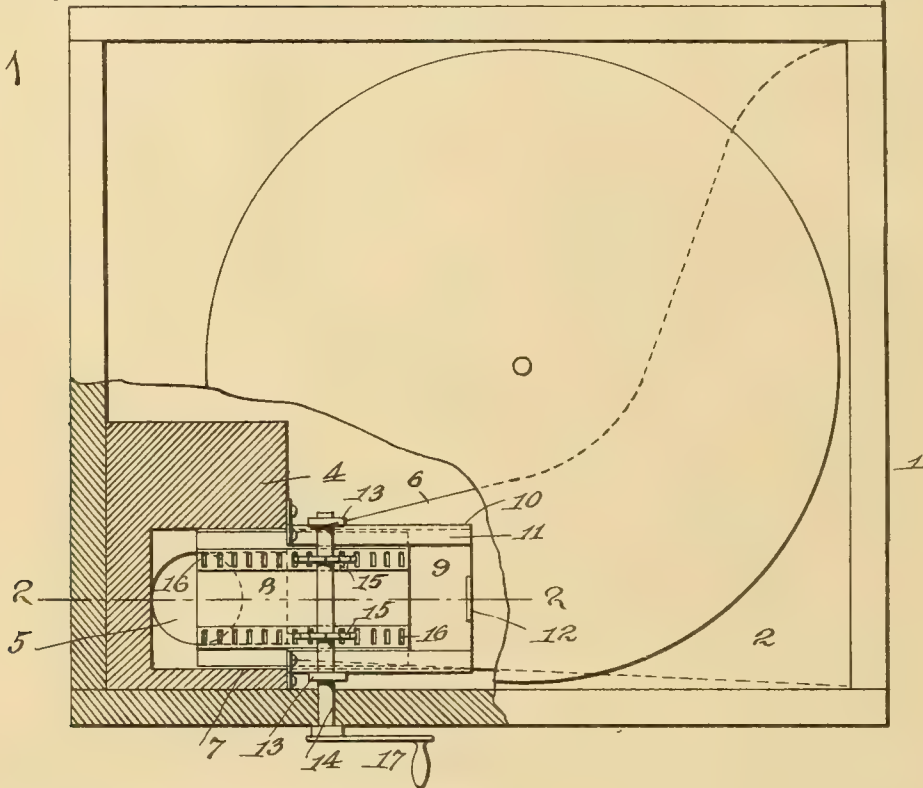


Fig. 2

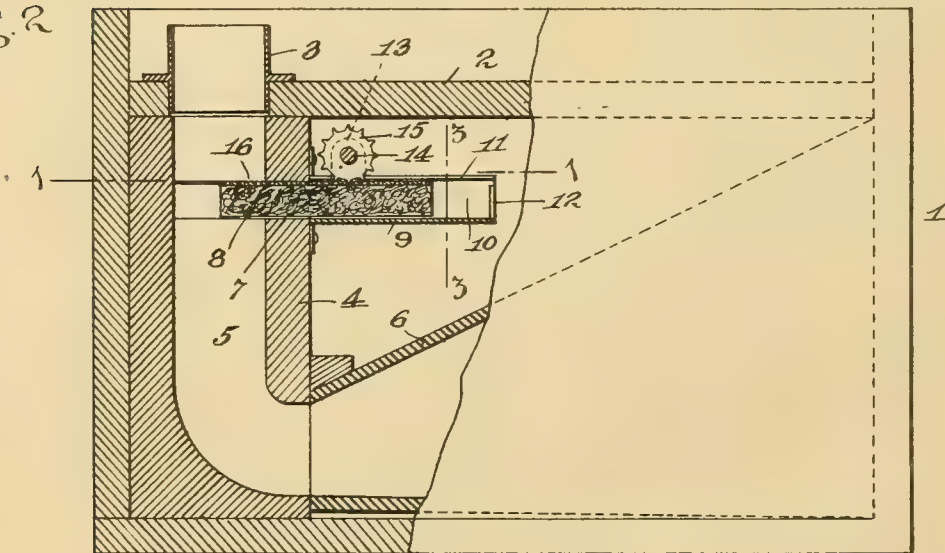
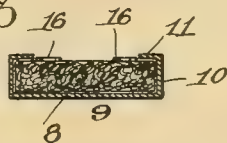


Fig. 3



Inventor
Pinus Farb
by Schuchter & Lotz
his Atty.

UNITED STATES PATENT OFFICE.

PINCUS FARB, OF NEWARK, NEW JERSEY, ASSIGNOR TO SONORA PHONOGRAPH CORPORATION, A CORPORATION OF NEW YORK.

SOUND-MODIFIER FOR TALKING-MACHINES.

1,270,278.

Specification of Letters Patent. Patented June 25, 1918.

Application filed February 1, 1917. Serial No. 145,944.

To all whom it may concern:

Be it known that I, PINCUS FARB, a citizen of the United States, and a resident of the city of Newark, county of Essex, and State of New Jersey, have invented a certain new and useful Improvement in Sound-Modifiers for Talking-Machines, of which the following is a specification.

My invention relates to sound modifiers for talking machines, for modifying the sound between the tone-arm and the horn to any desired extent.

The object of my invention is to provide a device which will be simple and effective in operation, not likely to get out of order, and will be locked in the desired position.

This and further objects will more fully appear in the following specification and accompanying drawings considered together or separately.

In the drawings,—

Figure 1 is a top plan view of a talking machine cabinet partly in section, the section being on the line 1—1 of Fig. 2, embodying my invention;

Fig. 2 is a side elevation partly in section, the section being taken on the line 2—2 of Fig. 1; and

Fig. 3 is a detail sectional view on the line 3—3 of Fig. 2.

In all of the above views, like parts are designated by the same reference characters.

In the drawings, 1 designates a cabinet having a motor board 2, to which a motor (not shown) is attached. In one corner of the motor board is an opening provided with a sleeve 3, in which a tone-arm (not shown) is seated. A block 4 is secured in the casing, and has an opening 5 in communication with the tone-arm and with a horn 6.

The block 4 is provided with a slot 7 beneath the motor board, and a panel 8 is carried in the slot. The panel is preferably composed of fibrous material, such as felt or asbestos. Rigidly secured to the block in line with the slot 7, is a tray 9 in which the panel rests. The tray is provided with side walls 10 having portions 11 which engage the top of the panel, and a stop 12 to limit the outward movement of the panel.

Carried in bearings 13—13 on the tray 9 is a shaft 14 which has rigidly mounted thereon two pinions 15, 15, the teeth of which engage racks 16, 16, carried by the

panel 8. The shaft 14 extends outside of the casing, and is provided with a crank 17.

The racks 16 are preferably strips of metal having perforations with which the teeth of the pinions engage.

The operation of the device is as follows:

By turning the crank 17 in the direction of the opening 5 in the block 4, the panel 8 will be moved to cover the opening 5, and thereby modify the sound. A turning of the crank 17 in the reverse direction, the panel 8 will not obstruct the opening 5, but on the contrary, will open the same to its entire width and permit the sound to emit in its full volume, unmodified.

In accordance with the provisions of the patent statutes, I have described the principle of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative, and that the invention can be carried out in other ways.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. A talking machine, having a passage communicating with an amplifier, a slide for adjusting the size of the passage, a guide for the slide, racks, having perforations, carried by the slide, pinions engaging the perforations on the racks, the shaft of the pinions extending outside of the casing, and a crank coöperating with the shaft for adjusting the size of the passage.

2. A talking machine, having a passage communicating with an amplifier, a flexible slide for opening and closing the passage, a guide for the slide, a stop for the slide, two parallel racks, having perforations, carried by the slide, two parallel pinions, carried on a shaft having stationary bearings, said pinions engaging the perforations in the racks, the shaft of the pinions extending outside of the casing, and means on the shaft operable from the exterior of the cabinet for opening and closing the passage.

3. A talking machine, having a passage communicating with an amplifier, a slot in said passage, having an opening in one side of the passage, a panel carried in the slot, a tray in which the panel rests, communicating with the slot, a stop to limit the outward movement of the panel, parallel racks carried on the tray, parallel pinions engag-

ing the racks, and a shaft for the pinions extending outside of the casing for actuating the panel for adjusting the size of the passage.

- 5 4. A talking machine, having a passage communicating with an amplifier, a slot in said passage having an opening inside of the passage, a panel composed of fibrous material, carried in the slot, a tray in which
10 the panel rests, rigidly secured to the passage and communicating with the slot, said tray having side walls and flanges on the side walls engaging the top of the panel, a stop carried at the extremity of the tray to
15 limit the outward movement of the panel,

two parallel metal racks, having perforations carried on the flanges of the tray, two parallel pinions having teeth engaging the perforations in the racks, a shaft, carried in fixed bearings, upon which the pinions are
20 mounted, said shaft extending outside of the casing, and a crank handle for the shaft to operate the panel for opening and closing the passage.

This specification signed and witnessed
25 this 17th day of January, 1917.

PINCUS FARB.

Witnesses:

WM. VARIN,

HERBERT W. WEISE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH NEEDLE.

1,270,526 ----- L.C. Keen & J. M. Klevan,
Filed Oct. 3, 1917,
Patented June 25, 1918.

L. C. KEEN & J. M. KLEVAN
PHONOGRAPH NEEDLE.
APPLICATION FILED OCT. 3, 1917.

1,270,526.

Patented June 25, 1918.

Fig. 1

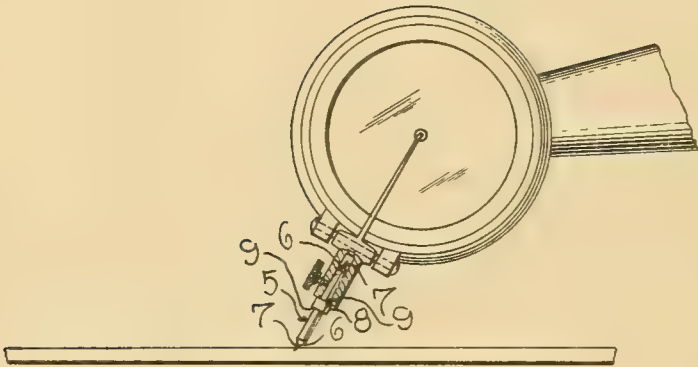
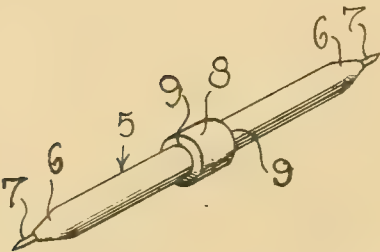


Fig. 2



Inventors
LEWIS C. KEEN
+ JOHN M. KLEVAN

By *Watson E. Coleman*
Attorney

UNITED STATES PATENT OFFICE.

LEWIS C. KEEN AND JOHN M. KLEVAN, OF PHILADELPHIA, PENNSYLVANIA.

PHONOGRAPH-NEEDLE.

1,270,526.

Specification of Letters Patent.

Patented June 25, 1918.

Application filed October 3, 1917. Serial No. 194,541.

To all whom it may concern:

Be it known that LEWIS C. KEEN and JOHN M. KLEVAN, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Phonograph-Needles, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improved phonograph needle, and has for its primary object to provide a double pointed needle, which is of such construction that the harsh, discordant scratching noise or sound incident to the operation of the phonograph with the ordinary commercial needle now in general use will be eliminated.

And it is another object of our invention to provide a double pointed needle of great wear resisting quality, having a central cylindrical enlargement constituting a stop to limit the movement of either end of the needle into the holder on the sound box, and thus prevent possible blunting or other injury to the needle point.

It is a further general object of the invention to provide an article of the above character which will be very serviceable and efficient in practical use, requires no alterations in the construction of the ordinary needle holder, and can be manufactured in large quantities at relatively small cost.

With the above and other objects in view, our invention consists in the novel features of construction, combination and arrangement of parts to be hereinafter more fully described, claimed, and illustrated in the accompanying drawing, in which:

Figure 1 is a sectional view through the needle holder of a sound box having one of our improved needles secured therein; and

Fig. 2 is a perspective view of the needle.

Referring in detail to the drawing, 5 designates the shank or body of the needle, preferably of cylindrical form and having conical or tapered ends 6, from the apex of which the needle point 7 projects, said point being adapted for engagement in the base of the record groove.

The needle shank is centrally formed with a cylindrical enlargement affording spaced annular shoulders 9. As clearly seen in Fig. 1 of the drawing, when one end of the needle is inserted into the bore of the needle holder,

one of the shoulders 9 abuts against the end of the holder and limits such movement of the lever so that the point 7 within the lever cannot strike the base of the bore and become blunted whereby it would be rendered un-serviceable. The needle is preferably constructed of silver and nickel or some other relatively light metal offering great resistance to frictional wear. Each of the needle points 7 may be used for the playing of a number of records.

From the foregoing description taken in connection with the accompanying drawing, the construction, manner of use and several advantages of our improved needle will be clearly understood. By the provision of a double pointed needle having the stop shoulders 9, the utility of phonograph needles will be appreciably increased, without increasing the manufacturing cost or the retail selling price of the needles to any material extent. Preferably, the distance from each of the shoulders 9 to the respective needle points is $\frac{5}{16}$ "', but it will be understood that this is not obligatory and our invention is not to be so limited, as the needle holders on various types of phonographs may differ in construction. Therefore, while we have herein shown and described the preferred form and construction of the several features of our improved needle, the device is nevertheless susceptible of considerable modification and we, therefore, reserve the privilege of adopting all such legitimate changes as may be fairly embodied within the spirit and scope of the invention as claimed.

Having thus fully described our invention, what we claim is:—

As an improved article of manufacture, a double pointed sound reproducing needle or stylus formed with a cylindrical enlargement intermediate of its ends, said enlargement presenting spaced annular shoulders affording stops to limit the movement of either end of the needle into a holder.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

LEWIS C. KEEN.
JOHN M. KLEVAN.

Witnesses:

JAMES A. REILLY,
WILLIAM H. WHITCOMB.

THE STATE OF NEW YORK

IN SENATE,

JANUARY 18, 1891.

REPORT OF THE

COMMISSIONERS OF THE LAND OFFICE
IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE
JANUARY 18, 1891.

ALBANY:
J. B. LEECH, STATE PRINTER,
1891.

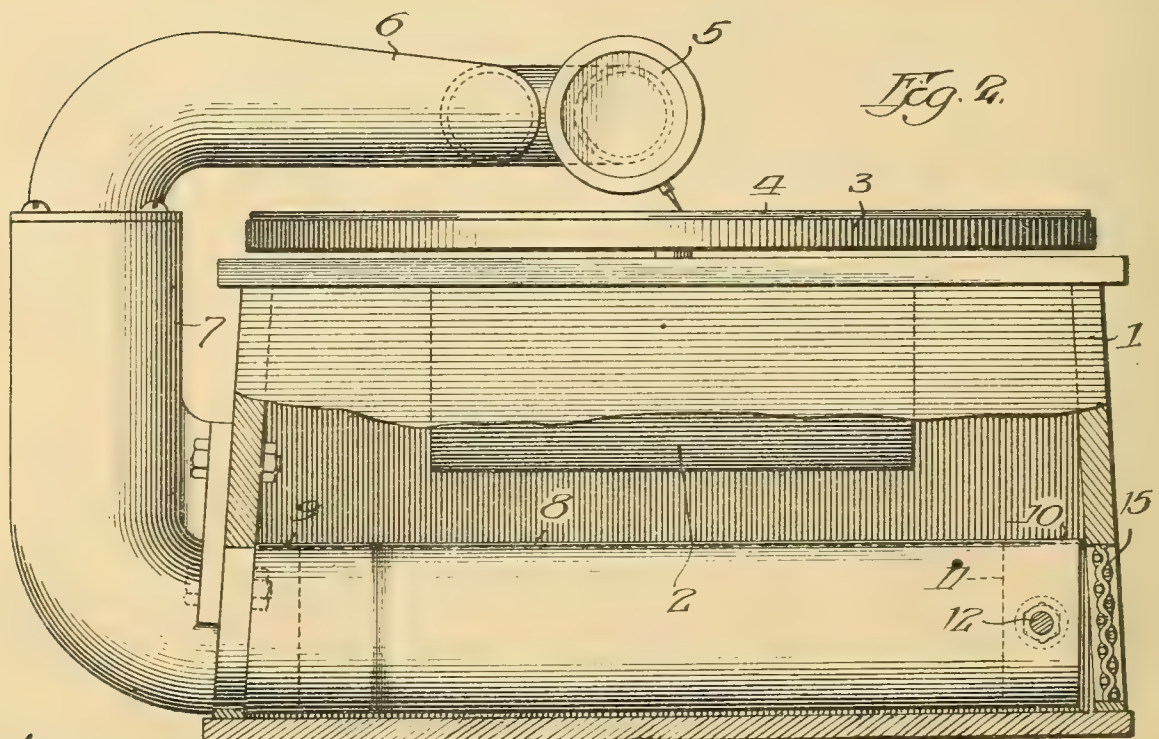
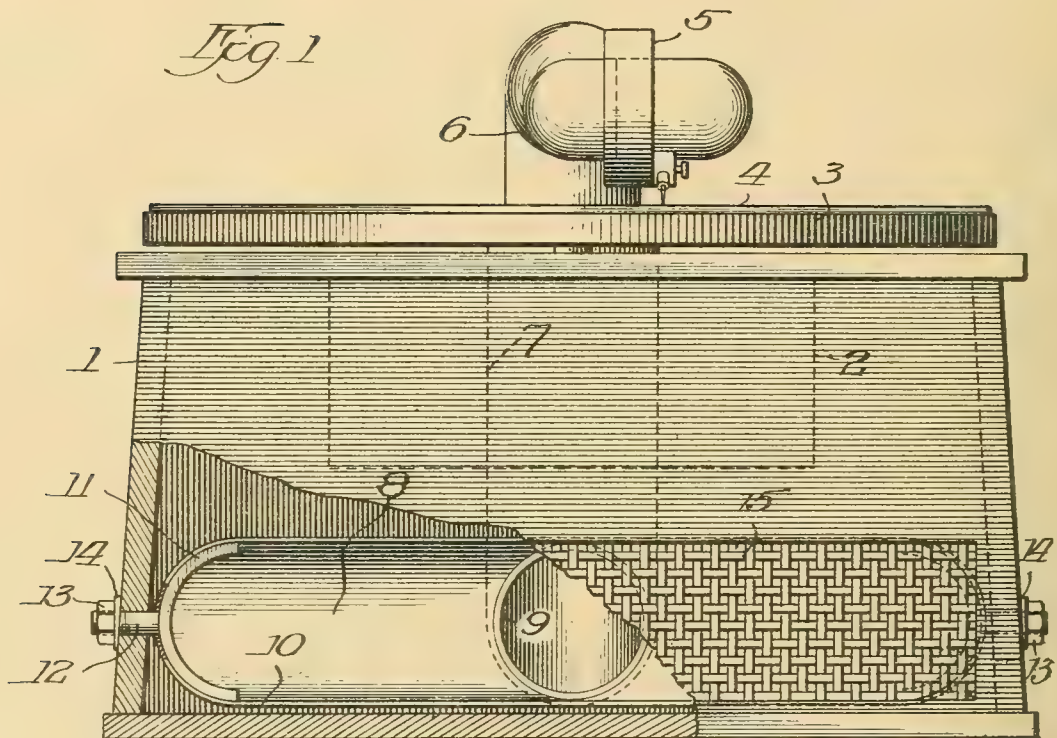
PHONOGRAPH

1,270,534 ----- C. W. Lorimer,
Filed Oct. 6, 1915,
Patented June 25, 1918.

G. W. LORIMER.
 PHONOGRAPH.
 APPLICATION FILED OCT. 6, 1915.

1,270,534.

Patented June 25, 1918.



Witnesses:
Ed. Harrison
A. J. Sauer

Inventor
 George W. Lorimer
 By *Georg Bayard Jones* Atty.

UNITED STATES PATENT OFFICE.

GEORGE W. LORIMER, OF PIQUA, OHIO.

PHONOGRAPH.

1,270,534.

Specification of Letters Patent. Patented June 25, 1918.

Application filed October 6, 1915. Serial No. 54,328.

To all whom it may concern:

Be it known that I, GEORGE W. LORIMER, a citizen of the United States, residing at Piqua, in the county of Miami and State of Ohio, have invented a certain new and useful Improvement in Phonographs, of which the following is a full, clear, concise, and exact description.

My invention relates to improvements in sound conducting horns and more particularly to phonograph horns.

The object of the invention is to provide a phonograph horn, the walls of which are under stress of such a character that the tone of the instrument is much improved.

A more specific object is to provide a phonograph horn of non-collapsible material, the wall at one end of which, is maintained under constant tension.

In the accompanying drawings, I have illustrated one embodiment of the invention. Other embodiments however, may be devised.

Figure 1 is an elevation partly in section of a phonograph which will serve to illustrate the improvement.

Fig. 2 is a side elevation thereof partly in section.

The phonograph is provided with the usual case or box 1, containing suitable driving mechanism 2 for rotating the supporting disk 3 and the phonograph record 4 placed thereon. The reproducer 5 may be of standard construction and opens through suitable tubing 6, 7, to the phonograph horn, which is indicated as a whole by reference 8. In the present illustration, the horn is made of metal and is of circular cross section at one end 9, but is of oval cross section at the other end 10, the intermediate portion being flaring. This shape may be obtained by using a funnel shaped horn and widening it at the large end to partially flatten it out.

The oval end of the horn is maintained under tension by means of a pair of semi-circular brackets 11, each provided with an extension 12 passing through the wall of the case 1, and secured by nuts 13, bearing against washers 14. By tightening up on the nuts 13, the brackets 11 are drawn apart and the pull thus results in adjusting the tension to the desired degree. The tensioning device also serves to support the end of the horn out of contact with the cabinet. Favorable results have been obtained not only with metal horns but with wood and

other fiber horns, the latter material being used in connection with the larger and more expensive machines.

The opening through which the sound issues may be closed by ratan 15 or any other suitable closure may be provided.

I have found in practice that by maintaining the horn under tension the sound is greatly improved, the vibrations being effected in such manner as to produce tones in a moderate priced instrument which compare favorably with those of the most expensive phonographs on the market. The tension may be maintained in other ways than illustrated and the shape of the horn need not necessarily be that shown in the drawings. I do not limit myself to horns formed of the materials specified, since other materials including flexible material of various kinds may be satisfactorily employed. Furthermore, while the present improvements have been described herein as particularly adapted for use in connection with phonograph horns, it is obvious that said improvements are of much broader adaptation, and hence it is not desired to limit the same to the particular use shown and described. For instance, the principle disclosed herein, whereby the tone qualities of a horn are improved, might also be used to advantage in connection with telephones, megaphones, and various other types of horns. Neither do I desire to limit myself to the details of construction described, except where limitations are imposed in the appended claims.

What I claim as new and desire to obtain by Letters Patent of the United States is:

1. A non-collapsible horn, the walls of which are maintained under tension to improve the quality of the tone.

2. A phonograph horn of non-collapsible material, the wall at one end of which is maintained under tension to improve the quality of the tone.

3. The combination with a phonograph horn, of means for drawing the walls apart at one end thereof to maintain said walls under tension to improve the quality of the tone.

4. A phonograph having a flaring horn of non-collapsible material, and means for maintaining the large end thereof under constant stress.

5. In a phonograph, the combination with the casing thereof, of a partially flattened

- horn of flexible material in the base thereof, the small end of said horn being circular and the large end thereof being oval, semi-circular brackets fitting within the ends of said oval, extensions thereon passing through the walls of said casing and means on the outside of said walls for drawing said brackets apart to maintain said horn under tension.
6. In a phonograph, the combination with a non-collapsible horn, of means for supporting the outlet end thereof and maintaining it under tension.
7. A phonograph having a permanently shaped horn, the walls of which are supported under tension.
8. In a phonograph, the combination with the casing thereof, of a horn, one end of which is supported by said casing, while the other end thereof is spaced from the casing and supported by means adapted to maintain the walls of said horn under tension.
9. In a phonograph, the combination with the casing thereof, of a horn, brackets fitting within said horn, extensions on said brackets passing through the walls of said casing, and means on the outside of said walls for drawing said brackets apart to maintain said horn under tension.
10. In a phonograph, the combination with the casing thereof, of a horn, one end of which is supported by said casing, and adjustable means supporting the other end of said horn under tension and out of contact with said casing.
11. In combination, a sound conducting horn, means for maintaining the walls of said horn under sufficient tension to modify the tone qualities thereof, and means for adjusting said tension.
12. In combination, a flaring sound conducting horn, means tending to enlarge the opening at the large end of said horn to thereby maintain the adjacent walls under tension, and means for adjusting said tension.
13. In combination, a sound conducting horn, a housing therefor, and means coöperating with said housing and with said horn to support the latter with its walls out of contact with said housing and to maintain said walls under tension.
- In witness whereof, I, hereunto subscribe my name this 2nd day of October, A. D. 1915.
- GEORGE W. LORIMER.
- Witness:
FRANK GEHLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

PHONOGRAPH DISK RECORD HOLDER AND EJECTOR

1,270,584 ----- G. E. Adams,
Filed Mar. 19, 1917,
Patented June 25, 1918.

G. E. ADAMS,
PHONOGRAPH DISK RECORD HOLDER AND EJECTOR.
APPLICATION FILED MAR. 19, 1917.

1,270,584.

Patented June 25, 1918.

2 SHEETS—SHEET 1.

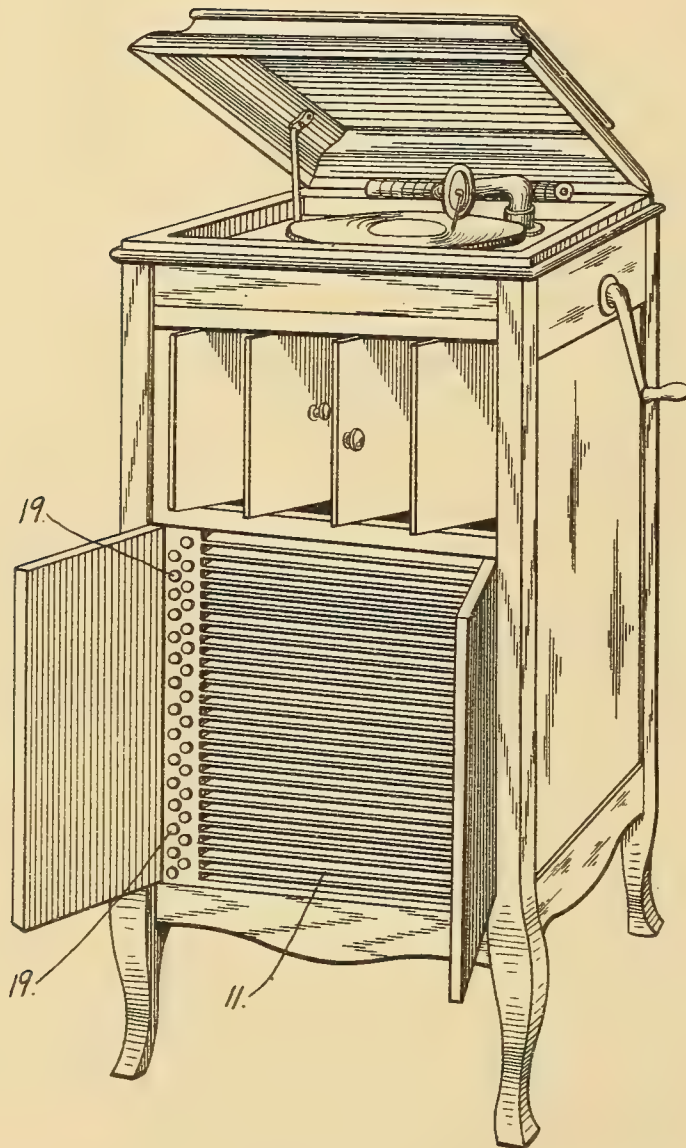


Fig. 1.

Inventor
George E. Adams.
By *Wilkinson, Ginata & Mackay*
his Attorneys

G. E. ADAMS.
 PHONOGRAPH DISK RECORD HOLDER AND EJECTOR.
 APPLICATION FILED MAR. 19, 1917.

1,270,584.

Patented June 25, 1918.
 2 SHEETS—SHEET 2.

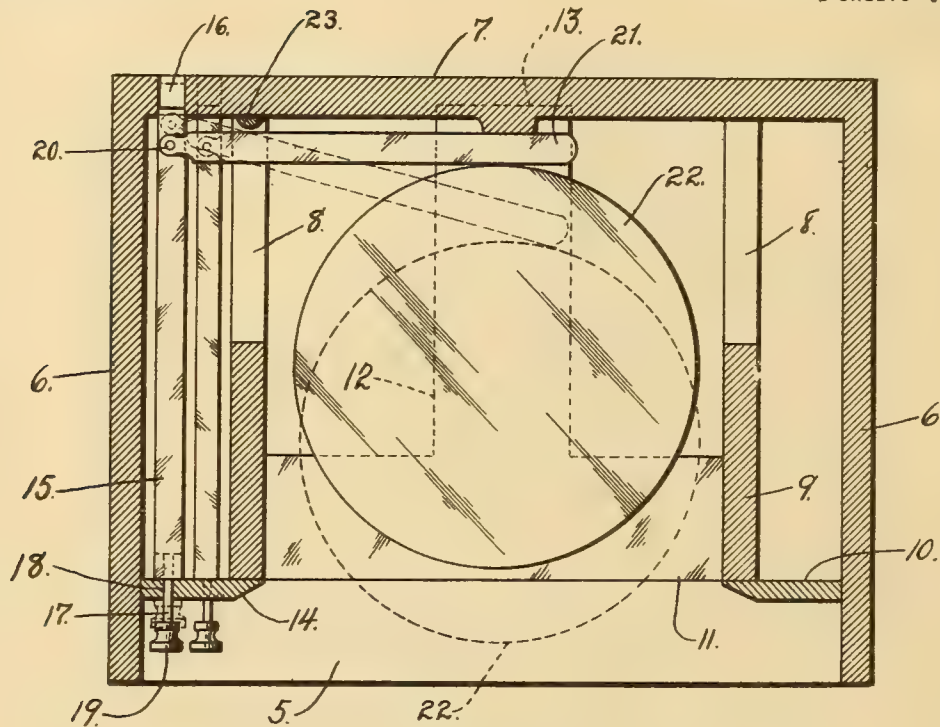


Fig. 2.

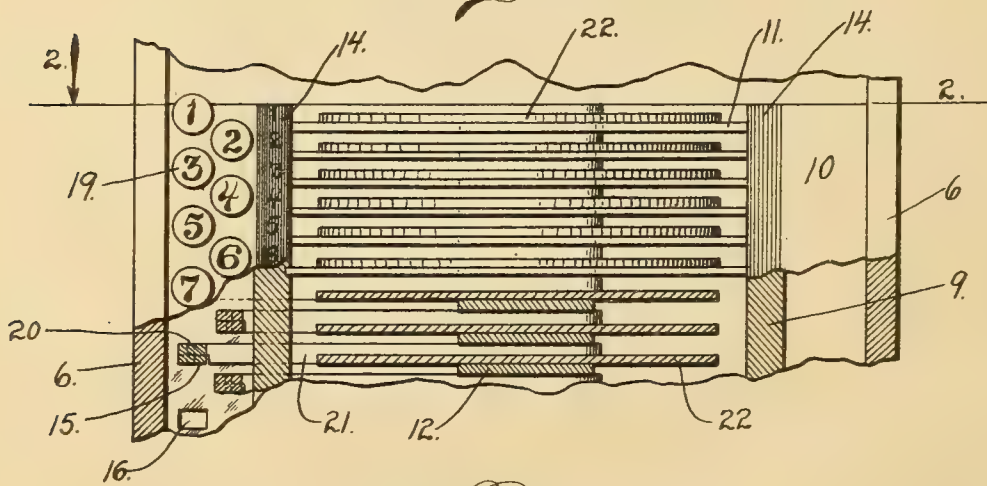


Fig. 3.

Inventor
 George E. Adams.
 By *Wilkinson, Ginata & Mackay*
 his Attorneys

UNITED STATES PATENT OFFICE.

GEORGE E. ADAMS, OF SALT LAKE CITY, UTAH, ASSIGNOR OF ONE-THIRD TO DANIEL ALEXANDER AND ONE-THIRD TO HAMMOND O. WILLIAMS, BOTH OF SALT LAKE CITY, UTAH.

PHONOGRAPH-DISK-RECORD HOLDER AND EJECTOR.

1,270,584.

Specification of Letters Patent. Patented June 25, 1918.

Application filed March 19, 1917. Serial No. 155,896.

To all whom it may concern:

Be it known that I, GEORGE E. ADAMS, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Phonograph-Disk-Record Holders and Ejectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in cabinets for phonographic disk records, such as used on graphophone and gramophone machines, of a type adapted to contain the disk records in individual selective arrangement, whereby, upon the actuation of a complementary selective key, any desired record in the cabinet may be automatically projected or ejected independently of the remaining disk records therein.

This has heretofore been accomplished with partial success by cabinets having a series of vertically disposed compartments, for the reception individually of the disk records, associated with actuating mechanism, comprising selective push bars, coöperating with spring controlled ejector levers pivoted thereto, but such an arrangement has not proven entirely satisfactory for many and varied reasons, which will more fully hereinafter appear in comparison with my present improvements.

In a preliminary way, however, I might state briefly that the arrangement of the disk records perpendicularly, provides only for a minimum number of records that the cabinet might contain, as it restricts the number to the exact width of the cabinet, leaving much waste space between them and the bottom of the talking machine proper, which space is generally covered by an ornamental front panel.

Also, the spring controlled actuating mechanism, with its several parts and connections, has its great disadvantages, outside of the primary fact that its parts get out of working order, by becoming displaced, wedged or broken, rendering the cabinet ineffective as a whole until repaired, all of

which is of considerable annoyance and expense.

One object of the present invention, therefore, is to overcome these objectionable features, in the accomplishment of which, I arrange the individual disk record compartments in horizontal series, thus enabling me to utilize the maximum disk record containing space of the lower compartment of the phonograph cabinet of whatever make or type, and in conjunction with this horizontal disposition of the compartments, I have devised the simplest form of actuating mechanism, which eliminates all unnecessary pivotal connections, springs and multiplicity of parts, liable to become displaced, wedged, broken or otherwise disabled.

At the same time, while my construction and arrangement is so simple as to be comparatively cheap to manufacture and assemble, it is in fact much more durable and positive and effective in action than the more complicated arrangements of the prior art.

Other objects and advantages will appear from the following description, and the essential features of novelty will be pointed out more particularly in the appended claims.

To more clearly understand the invention, reference will now be made to the accompanying drawings, forming a part of this application, in which drawings like reference characters designate the same parts in the several views, of which—

Figure 1, is a perspective view of a graphophone cabinet with my improved disk record holder and ejector shown as fully filling the bottom compartment thereof, and with the disk records omitted.

Fig. 2, is a sectional plan view, taken on the line 2—2 of Fig. 3, above one of the disk compartments, and showing a disk record, its ejector arm and push bar, in full lines, in their normal positions, as when the record is not called for, and in dotted lines illustrating the positions assumed when the actuating mechanism has been operated to eject a selected record, and

Fig. 3, is a fragmentary view looking toward the front of the cabinet as shown in Fig. 2, the upper portion being shown in ele-

vation, and the lower portion in vertical section.

It may be stated at the outset that, the record containing cabinets may be built up as
 5 completely incased sectional units, of desired dimensions, for stacking up after the fashion of sectional book cases, where a great number of records are kept, such as in music stores, talking machine establishments, and
 10 even in private homes.

Or as such an incased unit it may be bodily inserted in a corresponding sized phonograph cabinet base compartment, although in the latter case, it would probably be built
 15 up as a part of the phonograph cabinet itself, in that the bottom, side and rear walls of the phonograph cabinet would serve as the inclosing casing for my record holding cabinet.

However, in this application, the invention being the same in all cases, I shall describe my improvements as a unit complete in itself, rather than as a built in part of any particular type of phonograph cabinet
 20 base.

The record holding cabinet may be of any suitable structure, but for the purpose of lightness, combined with strength and durability, it is preferably of open box-work construction, having a base and top, flat front and rear pieces 5, side and rear inclosing walls 6 and 7, and spaced reinforcing struts or pieces 8, the forward portion of which extend upwardly in the nature of vertical
 30 supporting walls 9, for supporting certain rack elements or shelves, and 10 are vertical narrow front walls, between the supporting walls 9 and casing side walls 6, the front of the cabinet being virtually open, all of which
 35 will hereinafter more fully appear. Of course, when built up into a special phonograph cabinet base, the numerals 6 and 7 would designate the side and rear walls of the phonograph cabinet itself, and 5 the
 40 bottom of the base compartment.

11 designates a transversely disposed narrow front shelf, and 12 a rearwardly extending branch thereof, the two forming one of a series of open T-shaped racks, arranged
 45 in parallel horizontal rows to provide for a substantially indefinite series of horizontal compartments, restricted in number only by the height of the lower compartment of the phonograph cabinet, which compartments
 50 are of a proper vertical depth to receive in slidable relation a disk record, or a disk record and its sales envelop, in flatwise position, or preferably still a disk record in a dust proof soft casing, which would keep them
 55 cleaner and less liable to scratching or other injury, than by the employment of any automatic cleaning arrangement heretofore employed.

The ends of the front shelf portions are

secured in the supporting walls 9 and the
 65 ends of the rear extensions 12 are fitted in the rear inclosing wall 7, as indicated at 13 in Fig. 2.

These rack elements 11—12 or the forward shelf portion 11 may be covered with
 70 felt, velour or similar lining, if desired, to present a more finished appearance and to prevent scratching or abrasion of the records, but where a dust proof soft casing is employed, as above suggested, this would be
 75 entirely unnecessary and an additional expense only.

The inner edge portions of the narrow front walls 10 are beveled, as indicated at 14, and on one of these beveled faces are arranged a series of indicia, numerals being
 80 shown, each of which indicates one compartment of the cabinet. It is obvious that these indicia might be arranged on the other beveled face also, should it be found desirable
 85 to arrange a series of push bars on the opposite side of the cabinet as well, alternating with the actuating mechanism shown on the left hand side, only, in the drawings.

One of the primary characteristics of the
 90 invention is the simplicity and positive action of this actuating mechanism, as hereinbefore stated, which will now be specifically described.

Within the vertical space inside the inclosing wall 6, shown at the left hand side in the drawings, are arranged a plurality of rearwardly projecting horizontally disposed push bars, rods or slides 15, the rear ends of which are slidably mounted in guide openings 16, and the forward ends of which have a cylindrical neck or pin extension 17, integral or otherwise, bearing through the aperture 18 in the narrow front wall 10. The ends of these pins are provided with
 100 a head or push button 19, which carries indicia corresponding to that on the beveled face 14 adjacent thereto.

To the rear ends of these push bars 15 are pivoted, in any suitable way, such as by a
 110 mortised joint as indicated at 20, the outer ends of horizontally disposed ejector arms 21, the free inner ends of which latter are mounted to slidably ride in the disk record compartments of the cabinet, behind the disk records, engaging the disk records peripherally in their own plane, and exerting a leverage force in that same plane in ejecting the disk records 22 flatwise. This has a substantial degree of importance, for that in
 115 ejecting the disk records flatwise they cannot be projected completely out of the cabinet, which may be the case where vertical compartments are employed and the disks are rolled out peripherally, resulting in their
 120 falling to the floor and being broken.

A common vertical pivot rod could be employed, passing through all of these ejector

arms at a position say a little to the right of their pivotal connections with the push bars, for furnishing a proper fulcrum to provide leverage for the same, but my one chief aim in this connection is simplicity in construction, arrangement and assembly, in the avoidance of unnecessary working parts, and I prefer to make the push rods and ejector arms slidable bodily together, in so far as any other binding connections may be concerned. In order to provide a proper fulcrum, therefore, I simply mount a vertical rod behind the ejector arms, as shown for illustration, a vertical strip or bead 23 fixed to the rear wall 7, which will provide a disconnected common fulcrum for all of the ejector arms 21.

From the foregoing complete statement, it is believed that the operation of the improved construction will be fairly apparent, but may be stated as follows:

With the parts shown in the position indicated in full lines in Fig. 2, in pushing in on the top button 19, for instance, its push bar 15 is moved rearwardly, carrying with it the outer end of its ejector arm 21, which engaging at its rear edge against the common fulcrum 23 will throw its free inner end outwardly with a gentle uniform movement, and the edge of this free inner end engaging its disk record 22 peripherally, in its own plane, will slide the record forwardly of its compartment to project therebeyond a sufficient distance to be readily extracted for use, all as shown in dotted lines. Thus while my actuating mechanism is extremely simple, and free from parts that are liable to break or get out of order, still the operation is not only facile, but the action is positive yet gentle and without any jerky thrusts, which are liable to roll a vertically disposed record out on the floor.

In prior constructions, with spring controlled actuating mechanisms, when the record has been projected the spring control returns all of the parts to their normal positions. In my arrangement, when the record has been extracted, the actuating mechanism remains dormant, with the push button still in, serving in that position to indicate where the record has been taken from and is to be replaced, without having to search for the slot opening that is minus a record.

When the record has been played, and it is desired to return the same to the cabinet, its proper compartment is readily ascertainable, and upon pushing the record back in place the actuating parts are returned to their normal position, and the push button thrust out again. Thus there is nothing to bind, or get displaced, or break or otherwise get out of order.

I have herein only stated some of the

many advantages that my improved cabinet possesses over those in the art as known to me, and I will not attempt in this specification to enumerate all, but will emphasize finally that, outside of the simplicity of the actuating mechanism and the combined arrangement and functioning of the elements generally, the horizontally disposed compartments enable me to store the maximum amount of records of all makes, regardless of their thickness or diameter, which vary within wide limits as is well known.

They also enable me to retain records in their original packages, envelopes or in dust proof sacks or covers, for the horizontal compartments provide for the flatwise sliding projection of the record when ejected, and there is no interference with this planetary movement, which would not be the case in cabinets having vertical compartments, as the envelop or bag containers would prevent the rolling of the records out of their compartments.

Furthermore in these vertically arranged compartments, the construction is necessarily so frail and thin to secure anything like the necessary space to store a substantial number of records, and the ejector mechanism necessarily so correspondingly delicate that, outside of the parts breaking or otherwise becoming defective, the ejector arms themselves oftentimes bind, and it is impossible to eject the records at all, all of which is avoided by the horizontal arrangement and more substantial construction.

Having thus fully disclosed my invention it will be understood that I do not limit myself to the exact details set forth, excepting as come within the purview of the ensuing claims and a reasonable construction of the scope thereof contemplating a fair range of equivalents.

What I do claim as new and patentable, is:—

1. In a disk record cabinet, substantially as set forth, the combination of a casing including a horizontal series of flat T-shaped rack elements mounted to provide a corresponding series of horizontally disposed compartments, each adapted to receive an individual disk record in flatwise sliding position; an ejector element slidably mounted in each compartment at the rear thereof to engage an inserted record; and selective means operatively engaging the individual ejector elements for moving any of said ejector elements forwardly at will to project a desired record, substantially as described.

2. In a disk record cabinet, substantially as set forth, the combination of a casing providing a series of horizontally disposed compartments, each adapted to receive an individual disk record in flatwise sliding position; an ejector arm for each compartment,

having a free inner end slidably mounted therein at the rear thereof, to peripherally engage an inserted disk record in its own plane, and at its outer end projecting toward one side of said casing; an individual selective push bar for each of said ejector arms, operatively engaging the outer ends

thereof for swinging the inner end of any of said ejector arms forwardly at will to project a desired record; and a fulcrum element disconnected from but common to all of said ejector arms, substantially as described.

In testimony whereof, I affix my signature.

GEORGE E. ADAMS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

RADIAL SOUND AMPLIFIER

1,270,610 ----- C. F. W. Forssberg,
Filed Jan. 11, 1916,
Patented June 25, 1918.

1,270,610.

Patented June 25, 1918.

FIG. 1.

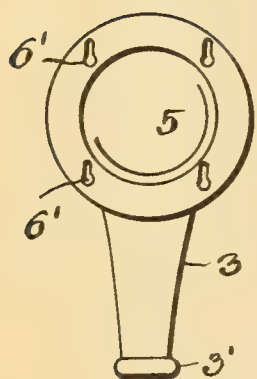
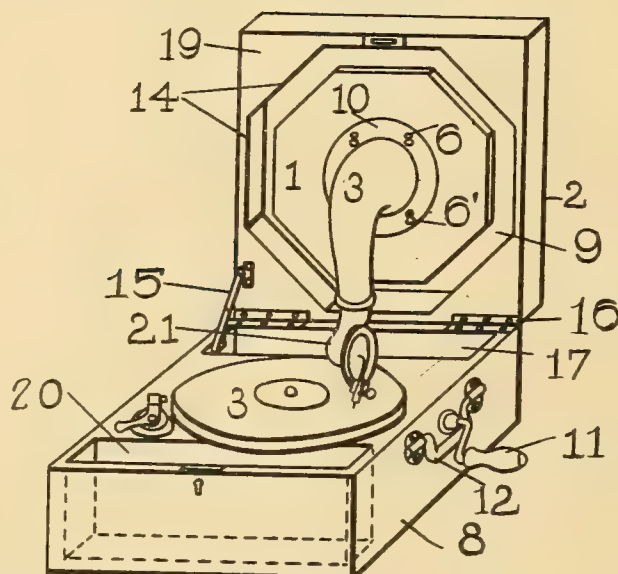
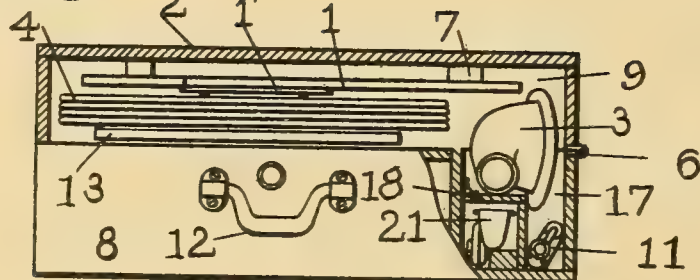


FIG. 2.

FIG. 3.



WITNESSES:

Elias Johnson
Olof F. Forsberg

Carl F. Wm. Forsberg, INVENTOR.

BY *Liam Larson*
 ATTORNEY

UNITED STATES PATENT OFFICE.

CARL FREDRICK WILLIAM FORSSBERG, OF BROOKLYN, NEW YORK.

RADIAL SOUND-AMPLIFIER.

1,270,610.

Specification of Letters Patent. Patented June 25, 1918.

Application filed January 11, 1916. Serial No. 71,474.

To all whom it may concern:

Be it known that CARL F. WM. FORSSBERG, a citizen of the United States, and resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Radial Sound-Amplifiers, of which the following is a specification.

This invention relates to sound amplifiers in phonographs, and especially to that class wherein the cover of the phonograph serves as a main portion of the amplifier.

One advantage of this invention is to provide a phonograph with an amplifier which can be disassembled and stored in a recess in the phonograph, rendering the whole apparatus compact and portable.

Another advantage is to provide a phonograph having a storage space for records between the cover and the turntable.

Further advantages and possibilities will become apparent as the specification proceeds.

In the drawing, like numerals refer to the same parts.

Figure 1 is a perspective view of an apparatus embodying the present invention in a normal operative position. Fig. 2 is a rear view of amplifying tube 3. Fig. 3 is a side view of Fig. 1 in closed position, with portions of the sides removed to expose the interior.

Many who have learned to appreciate phonographs in general have felt the lack of a convenient portable phonograph which would not sacrifice any of its acoustical capacity because of its being portable. It is with the end in view of providing such a portable phonograph which is primarily a perfect and efficient phonograph that the present invention is designed. Incidentally a new form of amplifier is included in the invention as will be presently described.

Referring to the drawing, the casing contains a spring motor which may be wound by the usual crank noted 13. The cover 2 is supported by hinges 16 and bracket 15 in a vertical operative position. The amplifying tube 3 is secured to the board 1 by screw heads as at 6, the narrow portions of the apertures 6', 6' in the flange 10 being retained thereby, the felt 1' serving to insure noiseless contact between flange 10 and board 1. The tonearm 21 is pivoted in the annular channel 3' and is provided with the soundbox as shown.

If the motor brake at the left of turntable 13 is released, the latter will revolve and the apparatus is ready to operate. If a record is then laid on the turntable and a needle inserted in the needle arm of the soundbox, the apparatus will project a considerable volume of sound about the board 1 from the marginal space 9.

The board 1 is really a soundboard, and is provided with a large aperture which is not illustrated to match opening 5 of amplifying tube 3. The soundboard is spaced from the top of cover 2 by cleats or bobbins as at 7 and is preferably of a regular form. In order to make the inner edges of the cover conform in spaced manner with the periphery of soundboard 1, the corners of the cover have been filled in as at 19 with blocks or strips and then covered with sheet metal or wood.

When the apparatus is in operation the sound rising up into tube 3 will be considerably amplified and pass through soundboard 1 and directly impinge on the top of cover 2, and then diverge radially between said top and the soundboard till it strikes all the sides like 14 of the cover, whence it will issue to the air from space 9. The width of this latter space is uniform and is preferably so designed as to produce a slight back pressure on the sound, destroying the screech of bad high notes and making the whole range of sound very uniform.

When it is desired to disassemble the phonograph, tonearm 21 and tube 3 are removed from their operative position and laid in either of the storage chambers 17 or 20 in the casing, likewise crank 11, chamber 17 being subdivided and adapted to receive the tonearm in a smaller chamber having a cover 18 to protect the same. Whatever records may have been used are laid on turntable 13 as at 4 and the cover closed. The whole apparatus is thus obviously self contained with all its appurtenances.

As modifications of my invention are possible without departing from its scope, such as making the soundboard 1 oval round or hexagonal, or making the angle of sides 14 with the top of the cover greater or less than 90 degrees, I therefore reserve all rights to such modifications.

Having thus fully described my invention, I desire to obtain by Letters Patent,

1. A phonograph including a casing and a cover provided with a top and sides, a

soundboard secured in said cover within said sides and top by means of cleats or bobbins located within the periphery of said soundboard, providing a uniform clearance 5 about and beneath said periphery, there being an aperture through said soundboard within the edges thereof for projecting sound against the top of said cover.

10 2. A phonograph comprising a casing and a cover, a soundboard secured in the cover, uniformly spaced from the top and sides thereof, and a normally rigid amplifying tube secured to said soundboard, there being an aperture in said soundboard pro- 15 viding an inlet for projecting sound from said amplifying tube directly against the top of said cover.

20 3. A phonograph comprising a casing and a cover, a soundboard secured in the cover, spaced from the top and within the sides thereof, and additions in the corners of the sides providing in combination with the

sides a uniform sound projecting space about the entire periphery of said soundboard. 25

4. A phonograph including a casing and a cover, a soundboard or disk secured in spaced manner within the top of the cover and concentrically therewith, there being an aperture through the center of said sound- 30 board and a uniform marginal space about the soundboard between the periphery thereof and all sides of said cover, and a normally rigid amplifying tube secured directly to said aperture upon said soundboard, sub- 35 stantially as described.

Signed at New York city, in the county of New York, and State of New York, this 7 day of January, A. D. 1916.

CARL FREDRICK WILLIAM FORSSBERG.

Witnesses:

ELIAS JOHNSON,

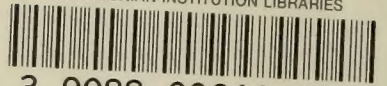
OLAF F. FORSSBERG.

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